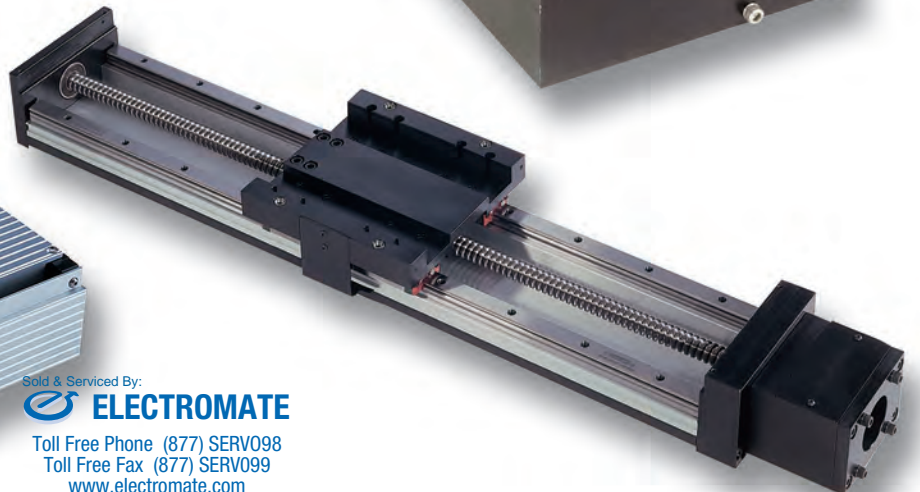
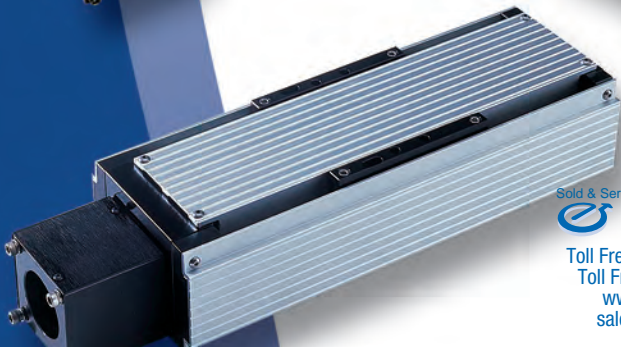
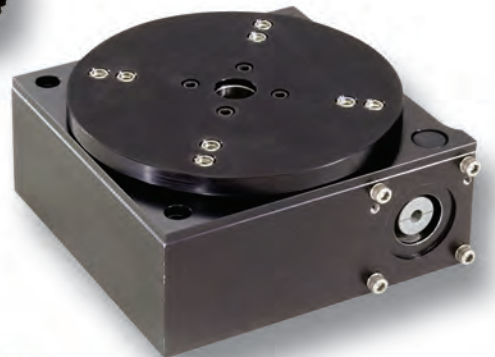
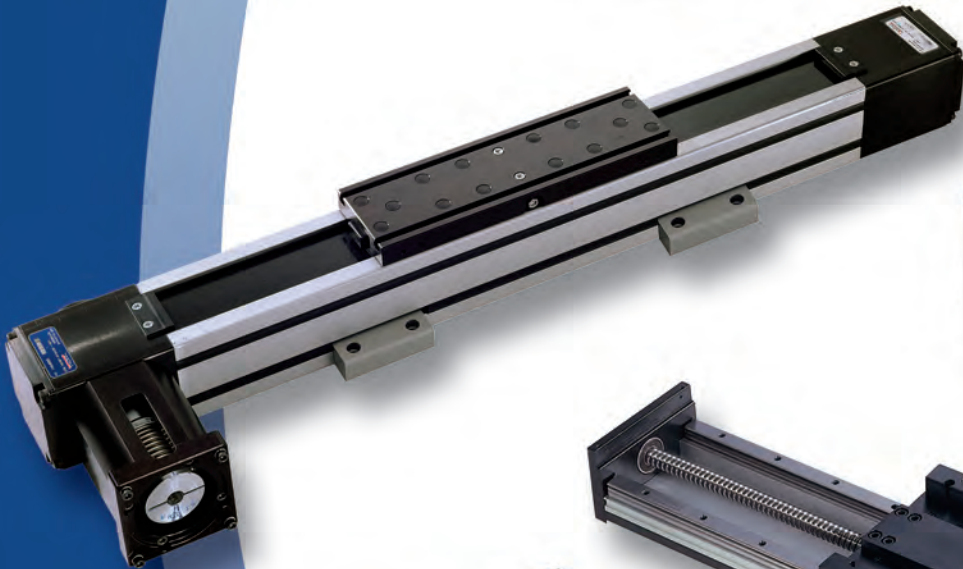
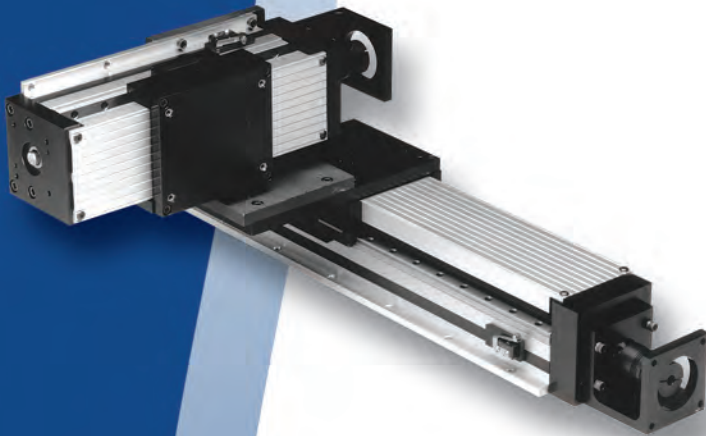


LINTECH[®]

Positioning Systems



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Standard Positioning Tables

LINTECH manufactures a wide range of standard belt & screw driven linear positioning tables, along with standard rotary positioning tables that operate in a wide range of applications. We have been manufacturing standard positioning tables for over thirty years. We pride ourselves on providing a wide range of options available for each of the different table series in this catalog. This allows the machine designer an opportunity to select a standard positioning table instead of what might be a custom system. Each of our table series is broken down into individual catalog sections. Each section has all the pertinent data for that table series located within it.

Overview - Screw Driven Linear Positioning Tables

Table Series	Dynamic Load Capacity lbs (kg)	Linear Bearing Type	Flatness & Straightness inch/inch (microns/25 mm)	Drive Screws	Unidirectional Repeatability (ground ball) inches (microns)	Maximum Axial Load (Thrust) lbs (kg)	Travel Lengths inches (mm)	Height inches (mm)	Width inches (mm)
130	200 (90)	Recirculating square rail	< 0.00013 (3,30)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	1,355 (615)	2 to 60 (50 to 1520)	2.375 (60,33)	2.875 (73,03)
100	3,100 (1406)	Recirculating square rail	< 0.00013 (3,30)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	1,355 (615)	2 to 60 (50 to 1520)	2.375 (60,33)	3.500 (88,90)
110	3,100 (1406)	Recirculating square rail	< 0.00013 (3,30)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	1,355 (615)	1 to 45 (25 to 1155)	2.375 (60,33)	5.250 (133,35)
90	3,300 (1496)	Recirculating round rail	< 0.00016 (4,06)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0002 (5)	1,725 (782)	6 to 60 (150 to 1520)	2.930 (74,42)	8.000 (203,20)
150	3,800 (1724)	Recirculating square rail	< 0.00004 (1,02)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	1,725 (782)	6 to 62 (150 to 1570)	2.625 (66,67)	6.750 (171,45)
160	5,600 (2540)	Recirculating square rail	< 0.00016 (4,06)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0002 (5)	1,725 (782)	6 to 60 (150 to 1520)	2.953 (75,00)	5.500 (139,70)
170	5,600 (2540)	Recirculating square rail	< 0.00016 (4,06)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0002 (5)	1,725 (782)	6 to 60 (150 to 1520)	2.953 (75,00)	6.000 (152,40)
200	8,800 (3992)	Recirculating square rail	< 0.00004 (1,02)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	2,110 (957)	6 to 55 (150 to 1395)	3.750 (95,25)	8.500 (215,90)
250	16,600 (7530)	Recirculating square rail	< 0.00004 (1,02)	Acme Rolled Ball Precision Ball Ground Ball	+/- 0.0001 (2,5)	3,630 (1646)	6 to 56 (150 to 1420)	4.875 (123,82)	10.000 (254,00)

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Overview - Belt Driven Linear Positioning Tables

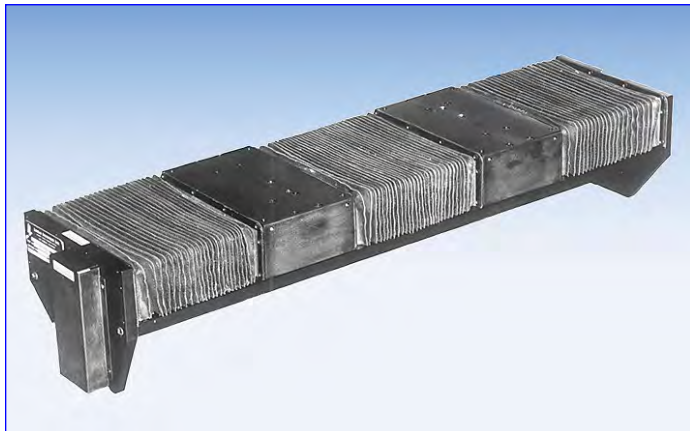
Table Series	Dynamic Load Capacity lbs (kg)	Linear Bearing Type	Unidirectional Repeatability inches (mm)	Drive Belt Width	Maximum Speed inches/sec (m/sec)	Maximum Axial Load (Thrust) lbs (kg)	Travel Lengths inches (mm)	Height inches (mm)	Width inches (mm)
120	3,100 (1406)	Recirculating square rail	+/- 0.001 (0,025)	16 mm	118 (3)	115 (52)	4 to 120 (100 to 3045)	3.000 (76,20)	3.500 (88,90)
180	5,600 (2540)	Recirculating square rail	+/- 0.001 (0,025)	32 mm	118 (3)	230 (104)	3 to 108 (94 to 2740)	2.953 (75,00)	6.000 (152,40)
550	10,320 (4681)	Recirculating square rail	+/- 0.001 (0,025)	50 mm	197 (5)	475 (215)	12 to 360 (300 to 9144)	3.937 (100,00)	3.150 (80,00)

Overview - Rotary Positioning Tables

Table Series	Dynamic Load Capacity lbs (kg)	Rotary Bearing Type	Drive Type	Ratios	Table Top Diameters inches (mm)	Through Hole inches (mm)	Accuracy arc-sec	Unidirectional Repeatability arc-sec
300	225 (102)	angular contact	worm gear	45:1 90:1 180:1	6 (152) 8 (203) 10 (254) 12 (305)	0.750 (19,05)	< 150	< 10
400	1,000 (453)	4 point contact	worm gear	30:1 180:1 90:1 270:1 360:1	5.48 (139,2)	4.500 (114,30)	< 180	< 12

Custom Positioning Systems

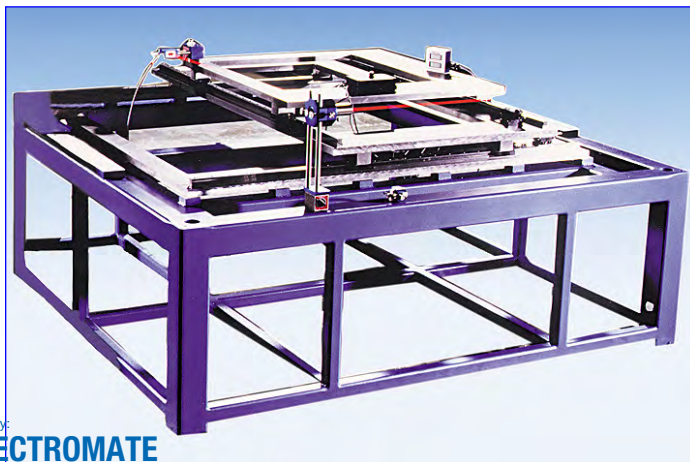
Sometimes a standard positioning system is not the right choice for a particular motion control application. Nor is it possible, or practical, to have the system built in house by your own design team. Let *LINTECH* take a look at your special requirements. *LINTECH* has been designing and building custom positioning systems for over 30 years. We can use our many years of experience to help you select the right approach to a unique motion control problem. Fill out our application guide on page A-45 and fax it to us or visit our website. We stand ready to assist you.



Two carriages (individually driven by two motors) on the same base for automated part assembly process

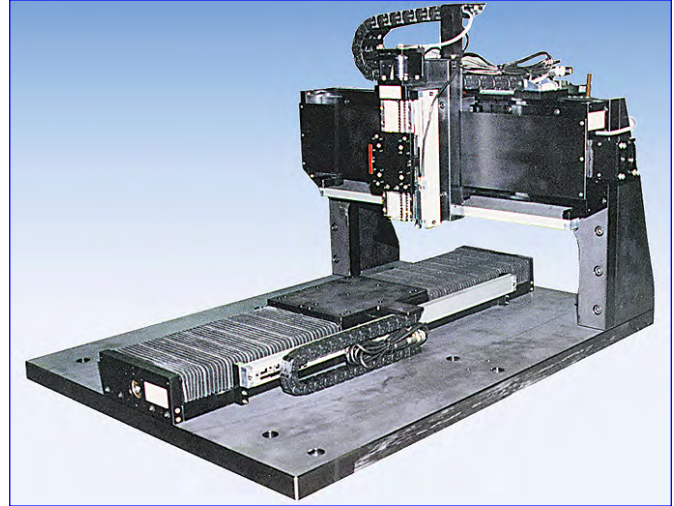


X-Y-Z automated assembly system with aluminum support structure

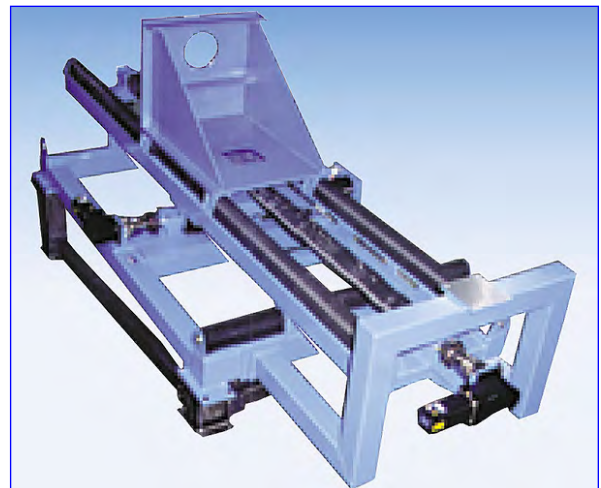


X-Y open frame inspection station with steel support structure

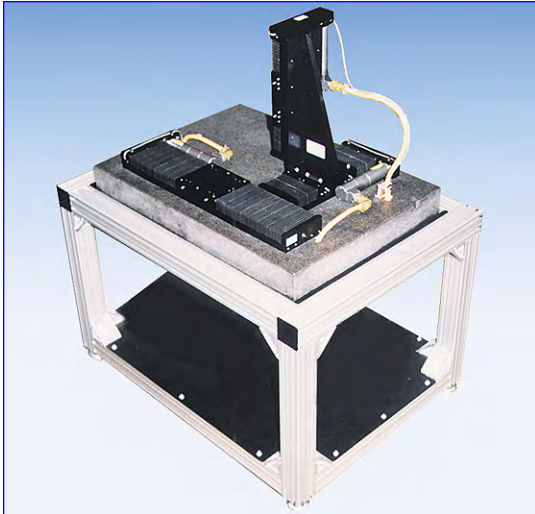
X-Z vision inspection station mounted on steel sub plate



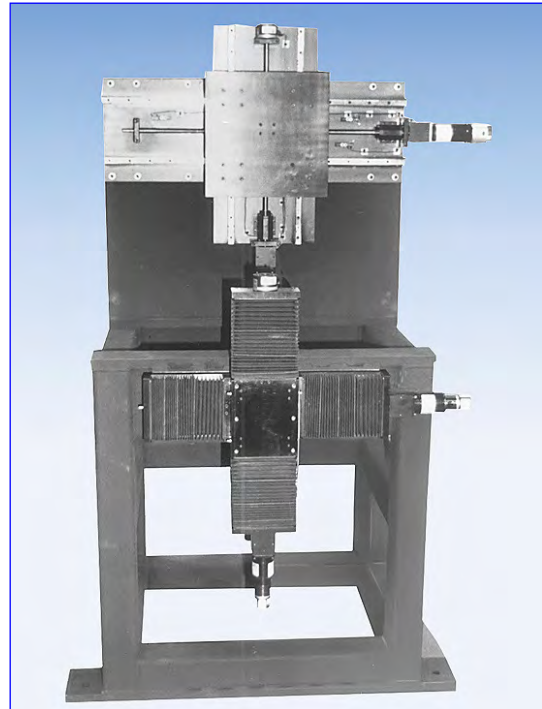
Belt driven long travel X-Y-Z inspection station with aluminum support structure



X-Y machine assembly process with steel support structure



X-Y-Z high accuracy
chemical coating process
mounted on granite & aluminum support structure

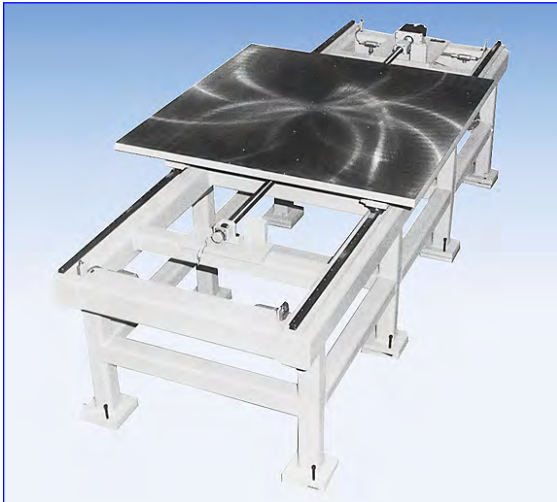
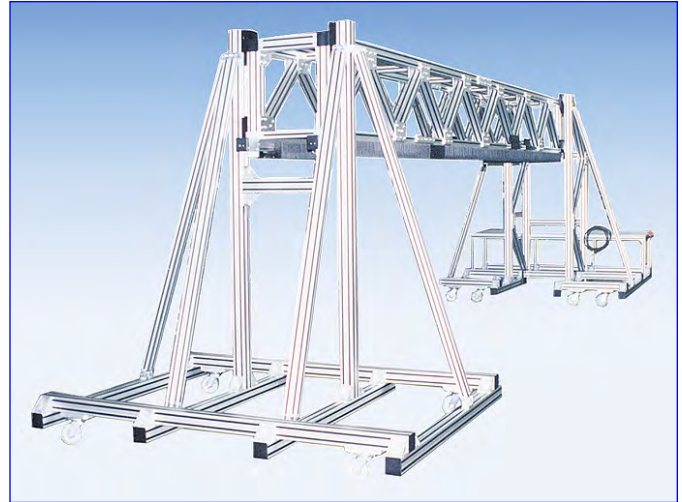


Two individual
X-Y axes for laser cutting
process supported by steel structure

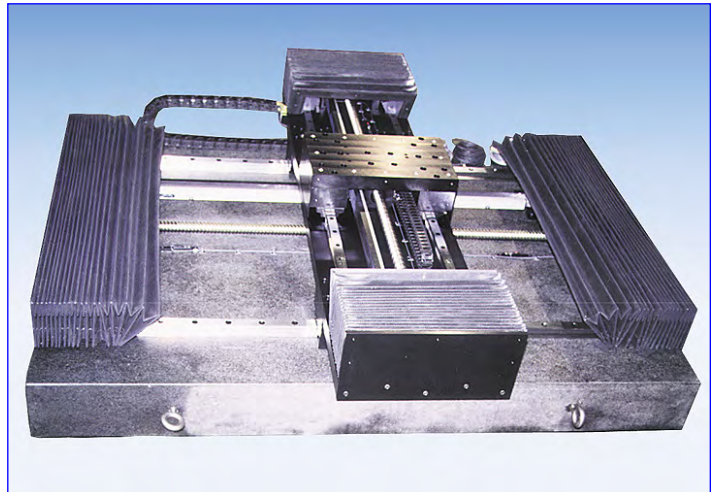


X-Y axis
water jet cutting process
with open frame steel support structure

X-Y belt driven
infrared inspection station
supported by movable aluminum structure



X axis machining station
with steel support structure



X-Y laser marking assembly
with granite surface support structure

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What kind of Positioning System do I need?

There are several different mechanical devices that can be chosen for a given motion control positioning application. These devices can have differences in the load carrying components, drive mechanisms, support structures, physical construction, along with numerous other options. All these parameters lead into a mechanical device that has certain performance specifications. Before selecting a mechanical device, one needs to understand these performance specifications, along with the pro's & con's of each mechanical device & its options.

Linear Positioning Systems consist of many different types of mechanical positioning devices. We are limiting our discussion here to electromechanical devices. Some of these devices are more suited to generate thrust forces, while other devices are more suited to position a load accurately & repeatedly.

Actuators (electric cylinders) are mainly thrust producing devices. These devices use either an acme or ball screw as the driving mechanism with the screw mounted in a rigid-free arrangement. Any moment or side load needs to be properly supported by a separate mechanical structure. From a positioning standpoint these actuators are neither highly accurate, nor repeatable.

Rodless Actuators are also mainly thrust producing devices. However, because of their design, they can be used in some positioning applications. These devices use either an acme screw, ball screw, or a belt as the driving mechanism. These devices have both ends of the driving mechanism supported, therefore longer travels and higher speeds are attainable. The carriage for the user load is mounted to some kind of linear bearing system, thus allowing for small side loads. Nylon bushings, plastic bearings, rollers, wheels, round or square rails are typically used for the linear bearing system. From a positioning standpoint these devices are not highly accurate, however they can be very repeatable.

Screw Driven Positioning Tables are typically used in applications where accuracy & repeatability are more important than axial thrust forces. The base, carriage, and all critical components are precision machined which contribute to the accuracy and repeatability of the system. These positioning tables use either an acme or ball screw as the driving mechanism. Ball & rod, cross roller, round rail, or square rail linear bearings are used to carry the user load. These linear bearing designs allow the user load to be positioned very accurately & repeatedly.

Belt Driven Positioning Tables are typically used in high speed (and/or long travel) positioning applications where a

screw driven table is not applicable. The belt & pulley drive mechanism, along with either round rail or square rail linear bearings, provide a repeatable, high speed positioning table. These tables provide the same speed capability independent of travel length. Using a high quality belt, pulley, and linear bearing mechanism provides a fairly accurate & repeatable positioning table.

High Accuracy Positioning Tables are typically used in applications where high accuracy and repeatability are very important. All components are machined to very tight tolerances in order to achieve the required accuracy and repeatability. Precision ground acme screws, precision ground ball screws, or brushless linear motors are typically used as the driving mechanisms. Precision ground cross roller, ultra high accuracy square rail, or air bearings are mainly used for the linear bearings. The combination of these precision components produce a very smooth operating table. Granite or a precision machined steel plate is typically used for the table mounting surface. Temperature controlled environment, machine shock absorbers, and high resolution linear encoders are also usually required in order to obtain the system accuracy and repeatability. All this comes at an increase to the overall positioning system cost.

Rotary Positioning Systems consist of mainly three different major designs to choose from. These are mechanical tables, direct drive tables, and rotary positioning tables.

Mechanical (air actuated) rotary tables are inexpensive devices that rotate to a finite number of locations. You typically cannot change their resolution and over time the repeatability can, and usually will change. Load capacities are typically large and these tables are very durable. However, an air source is required to operate the tables.

Direct Driven Rotary Devices have a built in brushless motor that turns the table top. Key benefits include high accuracy and torque in a package that does not have a gear reducer. Thus, there is little concern over mechanical wear of a gear reducer. The key disadvantages include high system cost, a tall table package, and the requirement of using a specific motor control system, one designed for that rotary table device.

Rotary Positioning Tables use a precision machined worm gear assembly and either ball, cross roller, or angular contact bearings to support the table top load. Different gear ratios allow for either high resolution or high speed in a low profile package. The use of any step motor, or servo motor system to drive this rotary table is a key advantage. This allows the use of a preferred motion control system.

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Items to Review

When selecting a positioning table, each of the following items should be reviewed thoroughly by the user. Some items will not be of major importance for a specific application. However, by reviewing each and every item, a positioning table can be selected that will give the required performance over the life of the system.

- Bearing Designs** - Linear (ball, cross roller, round rail, square rail, and air) bearings, along with rotary bearings. (See pages A-10 to A-12)
- Drive Mechanisms** (acme screws, ball screws, belt, and worm gears). See pages (A-13 to A-15)
- How to Select a Positioning Table** which includes safety factors and travel life. (See page A-16)
- Load Capacities** of all the critical elements of a positioning table need to be thoroughly reviewed in order to select the proper table for a given application. This includes capacities for bearings, drive mechanisms, and table structures. (See pages A-17 to A-27)
- Maximum Speed** of a positioning table sometimes depends on the bearing components and sometimes depends on the drive mechanism. (See page A-28)
- Acceleration & Thrust Forces** are parameters that can put extra stresses on positioning table components in certain situations. (See page A-29)
- Accuracy & Repeatability** are two of the most misunderstood parameters when selecting a positioning table. By determining what it is you really need, will help you select a cost effective positioning system. (See pages A-30 to A-33)
- Table Physical Size** (See page A-34)
- Lubrication** (See page A-35)
- Mounting Considerations** (See page A-36)
- Motor Couplings** (See page A-37)
- EOT (end of travel) & Home Switches** (See page A-38)
- Encoders** (See page A-39)
- Power-off Brakes** (See page A-40)
- Multi-Axis Systems** (See page A-41)
- Environments** (See page A-42)
- Testing** (See page A-43)
- Custom Systems** (See page A-44)
- Application Guide** (See page A-45)
- Motor Sizing** (See pages A-46 to A-49)

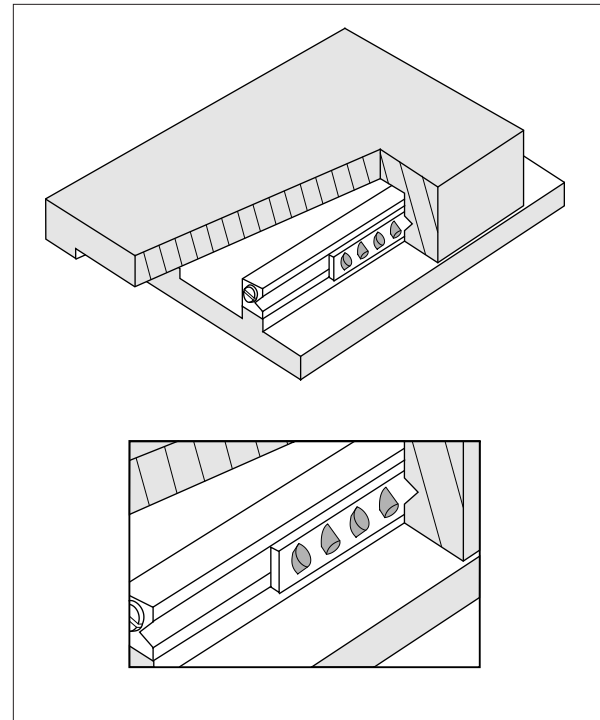
Bearing Designs

The main function of a positioning table's linear, or rotary bearing is to carry the user mounted load while the table is in motion. The bearings are also a key element in determining the overall positioning table accuracy and repeatability. Each bearing design provides advantages and disadvantages in load capacity, size, cost, stiffness, and friction. Selecting a positioning table with the right bearing design for a given application is essential.

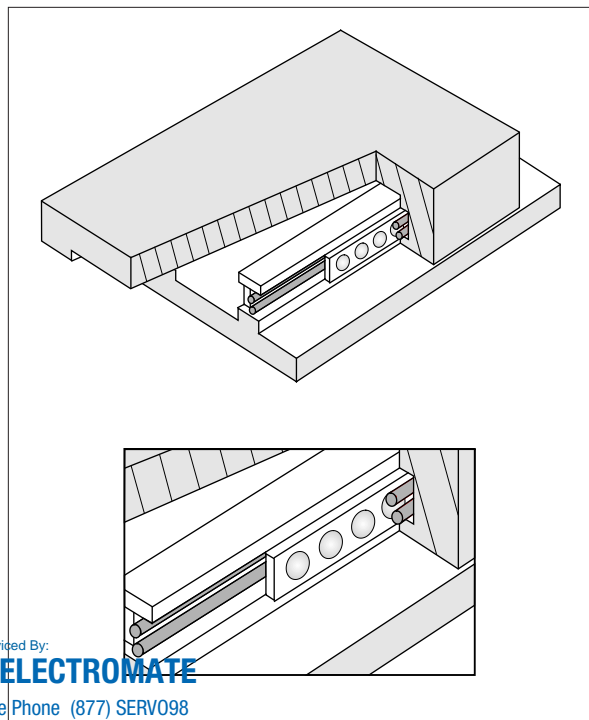
Linear bearings are also a key element in determining how straight and flat a linear positioning table is, which helps determine accuracy & repeatability. The five primary linear bearings used within positioning tables are ball & rod, cross roller, round rail, square rail, and air bearing.

Ball & rod bearing tables use two rows of non-recirculating steel balls that are rolling between four steel rods located on each side of the table. Two of the steel rods are mounted the entire length of the table base, while the other two steel rods are mounted the entire length of the table carriage on each side of the table. The ball bearings, which are held in a retainer assembly, roll between the steel rods on the base and the steel rods on the carriage, as the carriage moves. This design produces point contact for loading between the steel rods and rolling balls. This provides a low friction, smooth operating system at an economical price. However, this design is limited to light loads, short travel lengths, minimal moment loads, and is difficult to preload. Because the carriage extends past the base as it travels, this table requires a larger horizontal envelope area and protective shields like cover plates & waycovers can not be used.

Cross roller linear bearing tables are very similar in operation as the ball & rod bearing tables. The rolling balls are replaced with cylindrical rollers, and the steel rods are replaced with ground "V" ways. The larger surface contact between the rollers & "V" ways typically increases the table load capacity by up to 3 times more over a comparable ball & rod type system. These table designs also produce better flatness and straightness specifications over the ball & rod type. Thus they are typically used in higher accuracy type of applications. However, they have the same disadvantages as the ball & rod type tables which are short travel lengths, minimal moment load capacity, large horizontal envelope area, and no possibility of using protective cover plates or waycovers.



Cross Roller Bearing



Ball & Rod Bearing

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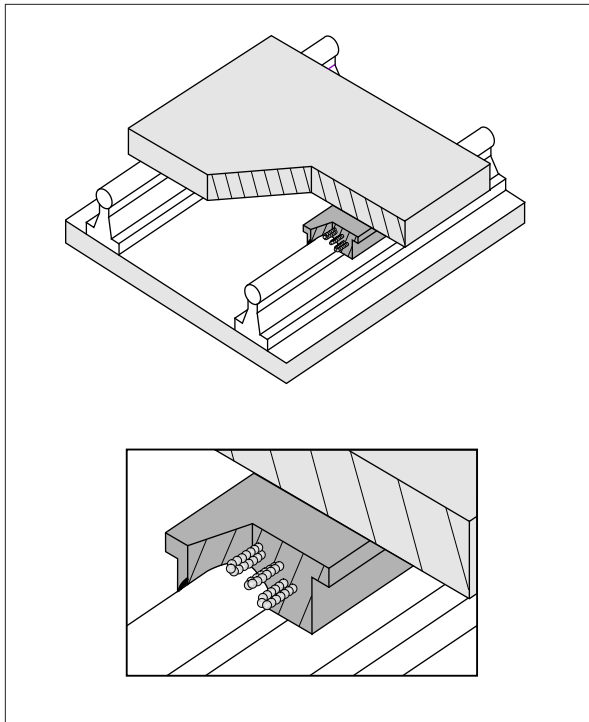
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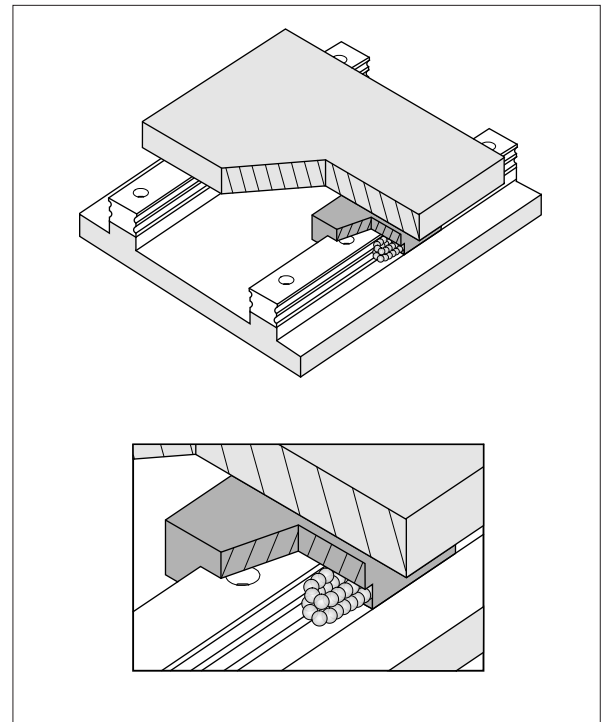
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Round rail linear bearings use four bushings with recirculating balls which are mounted within either two, or four pillow blocks. The pillow blocks are then mounted to the carriage, which rides on two round, hardened & ground shafts (which are mounted to the base). Travel lengths are only limited by the available shaft and base length. The point contact between the recirculating balls in the bushing and the round shaft produces a very low friction positioning table. The greater number of balls contacting the ground shaft over a ball & rod type table, provides for a larger load capacity system. This table design provides long travel lengths, good load capacities, large moment load capacities, and can accommodate protective cover plates & waycovers.



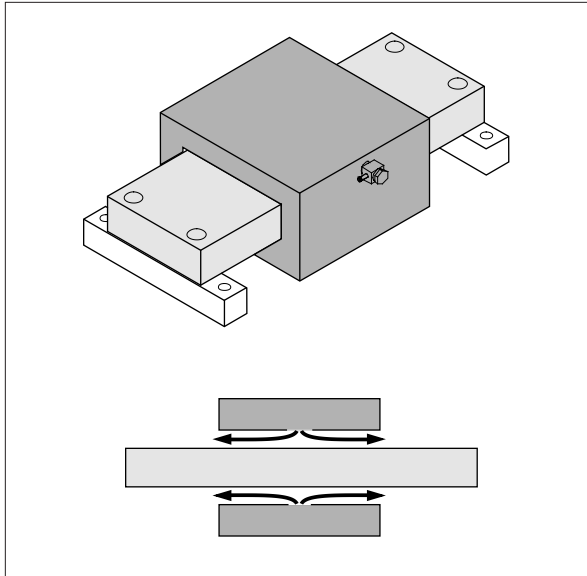
Round Rail Bearing

Square rail (linear guide) bearing tables are very similar in operation as the round rail tables. The round shaft has been replaced with a rectangular (square) rail, while the round rail bushing has been replaced with a rectangular bearing block. The recirculating balls in the bearing block contact more surface area on the curved ball race on the square rail. This design provides a table that has increased load capacity, increased moment load capacity, and higher system rigidity over the round rail. Because of the precision ground ball races on the rails, these linear bearings will have better flatness & straightness specifications than a round rail system. Table travels are only limited by the available rail, and base length. This table design is also able to handle shock & vibration forces better than a round rail system due to its bearing design, and can accommodate protective cover plates & waycovers.



Square Rail Bearing

Air bearing linear tables create a small air cushion between the table carriage and the table base (guide rail). This provides a non-contact linear bearing system that is rigid, friction free, and cog-free. Using a very accurate guide rail (rectangular or square) can produce excellent flatness & straightness specifications. Typical drive mechanisms include high accuracy acme screws and linear motors. Using a high accuracy non-contact linear motor drive system, and a high accuracy non-contact linear encoder, can produce a very accurate positioning table, one that could virtually last forever.



Air Bearing

Rotary bearings are a key element in determining how much vertical, radial, and axis runout a rotary positioning table has, along with its load capacity. The typical designs used in rotary tables are ball, cross roller, angular contact, and four point contact radial bearings.

Ball bearing rotary tables typically use one or two radial bearings to support the load as the table top rotates. This design provides for a relatively low profile table with a small load capacity, while minimizing runout errors.

Cross roller bearing rotary tables are very similar in operation as the ball bearing rotary tables. The rolling balls have been replaced with cylindrical rollers. This design provides for a relatively low profile table with a larger load capacity than the ball bearing tables. Runout errors are typically the same to less than the ball bearing table.

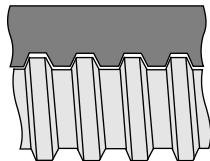
Angular contact bearing rotary tables use one or two angular contact bearings to support the load as the table top rotates. This design provides for a larger load capacity table than the ball bearing table, which can also handle small moment loads. Typically these tables have a higher profile than a ball bearing table, yet have the same range of runout errors.

Four point contact bearing rotary tables use 2 four point contact bearings to support the load as the table top rotates. This design provides for a large load capacity table that can handle higher moment loads than other designs. This bearing design also allows for large through holes.

Drive Mechanisms

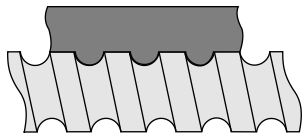
The main function of the drive mechanism within a positioning table is to move the load. It is an element that contributes to position accuracy, repeatability, speed, and mechanical system resolution. The linear drive mechanisms *LINTECH* uses include acme screws, ball screws, and belt & pulley assemblies. Precision worm gear assemblies are the main rotary drive mechanism used.

Acme screws typically use a turcite (polymer), or bronze nut. The nut, which is attached to the table carriage, moves back and forth along the linear bearing system as the screw rotates. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. Acme screws work fine for applications requiring low speeds, noise and duty cycles. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back-driving of the attached load. However, the friction of the acme screw can affect low speed smoothness (in some applications) and its long term life is significantly lower than a ball screw.



Acme Screw

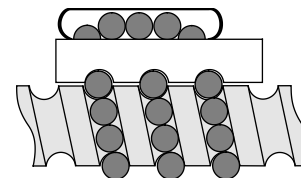
The **Turcite nut** option available with rolled ball screws operates very similar to an acme screw. The polymer nut contacts the ball screw grooves differently than an acme screw assembly does. This produces a drive mechanism that has less friction than an acme screw, thus potentially allowing for higher speeds and less input torque required from an attached motor for a given application. It provides smooth motion, low audible noise, and is ideal for vertical applications. Also, using the turcite nut with high lead ball screws provides for faster linear speeds.



Turcite Nut with Ball Screw

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. The nut, which is attached to the table carriage, moves back and forth with the linear bearing system as the screw rotates. Using a higher lead ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw. See the chart on page A-14 for a more general comparison of the different screws *LINTECH* provides in its positioning tables.



Ball Screw

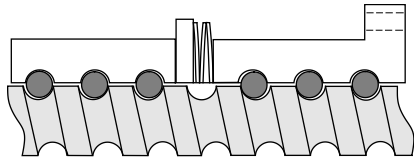
Accuracy grades of acme screws and ball screws is typically reflected by its "lead error" specification, which is generally given in a "in/ft" (microns/300 mm) rating. This "lead error" is the primary element in determining the position accuracy of a positioning table. The better the "lead error" (better position accuracy), the more costly the screw assembly. *LINTECH* provides position accuracy specifications for the different screw assemblies in each table series section. Higher grade accuracy acme, and ball screws are available upon request.

Drive Mechanisms

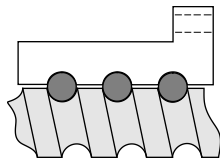
Screw Drive Comparison Chart

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash <i>non-preloaded nut</i>	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

Preloading of an acme, or ball screw nut is the process of eliminating backlash within the nut assembly. Eliminating the backlash in a nut becomes important for those applications requiring good bidirectional positioning and repeatability. Also, eliminating nut backlash can help stabilize an electronic motion controller. Some assemblies use two nuts that are separated by a spring (or spacer) which provides a force between the two nuts. This process is used with acme screw, rolled ball screw, and precision ball screw assemblies. The ground ball screw option typically eliminates backlash by using "oversized" recirculating balls in one nut that is matched to the screw thread. *LINTECH* sets all standard preloaded nut assemblies in this catalog to a light preload. This light preload force removes backlash while creating minimal breakaway torque. For a given application, if a set preload force (or a specific breakaway torque value is required), contact *LINTECH* before ordering. Also, be aware that increasing the nut assembly preload will decrease its life.



Two Nut Preloaded Ball Screw Assembly

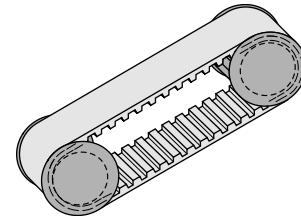


One Nut Preloaded Ball Screw Assembly

Resolution of a screw driven positioning table is directly related to the lead of the screw. This resolution is a mechanical table resolution, not a system resolution. The system resolution needs to take into consideration the motor/drive control resolution. The lead of a screw is the distance traveled by the nut (or carriage) for one revolution of the screw. Therefore, a screw with a 0.200 inch lead will travel 1.000 inch when the screw rotates five (5) revolutions. While a screw with a 0.500 inch lead will travel 1.000 inch in just two (2) screw revolutions. Using the screw with a 0.200 inch lead will provide better mechanical resolution over the screw with the 0.500 inch lead. However, the 0.500 inch lead screw will require more motor torque to move a given load. *LINTECH* provides a wide selection of screw leads for each table series (see individual table sections)

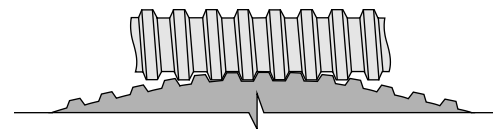
Maximum speed of a screw driven positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing supports. *LINTECH* uses fixed-simple screw end supports in its positioning tables. Using a screw with a higher lead (i.e. a 0.500 inch lead instead of a 0.200 inch lead) will provide higher linear speeds. Individual table sections provide charts indicating the maximum speed for a given travel length using a specific screw.

Belt & pulley driven linear positioning tables use a high strength, steel reinforced polyurethane belt and two pulleys. Belt driven tables provide a solution for those high speed (and/or long travel) applications which require good repeatability. Belt drive system resolution (lead) is determined by the pitch diameter of the drive pulley. The maximum speed for a given application is either limited by the linear bearing top speed or the thrust force capacity of the belt.



Belt & Pulley Assembly

Rotary positioning tables use a precision worm gear assembly as the drive mechanism. The assembly consists of a worm wheel and a worm shaft. These gears are precision machined in matched sets, and are lapped to provide very smooth motion. This provides very precise positioning with little backlash. However, the high friction of the worm gear assembly limits the tables top speed, efficiency, and duty cycle. Gear ratios from 30:1 to 360:1 are available with these positioning tables.



Worm Gear Assembly

Specifications

Reviewing the required application load, life, speed, repeatability, position accuracy, and environmental conditions against a manufacturer's specifications for a given table, should be an easy process. However, here lies the problem. There is no industry standard for specifying the ratings of positioning tables. As an example, the load rating for a specific positioning table is given as a dynamic, static, or structural capacity. Rating a table by each of these parameters can yield a different load capacity (or life) for that table, even though all the tables may have the exact same components within it.

LINTECH has taken the following approach for the rating of its positioning tables. We provide the maximum capacities for all the critical components of a table. Then by the use of some equations and safety factors, one can estimate the life of a positioning table for a given application. This process not only allows for the selection of a cost effective table solution for a simple application, but also will help with the correct selection of a positioning table for those very demanding applications.

Safety Factors

As a practice, safety factors should always be used when selecting a positioning table for a given application. For most real world applications, generally people do use safety factors. However, sometimes the incorrect safety factor, or no safety has been used. This can lead into an unexpected system failure. *LINTECH* provides, in a chart form, different safety factor recommendations for each of the critical elements within a positioning table. Keep in mind that these recommendations for safety factors are not hard & fast rules. Safety factors for a specific table element may have to be increased (or decreased) due to the application requirements.

Load Ratings

The applied load that a positioning table will see needs to be compared against the load capacities of all critical components within a given table. *LINTECH* publishes several load capacities for each positioning table series. Some of these capacities are dynamic, and some are static. These capacities mainly deal with the linear bearing system, the drive mechanism, and the structure of the table. Static values are capacities of the components with the table at rest (not in motion). Dynamic capacities pertain to the table in motion and are typically based on the number of inches (or km) traveled.

Required Life

It is important to evaluate the required (or expected) life from a positioning table for a given application load. Below are two examples which illustrate the importance of a dynamic load rating based upon travel life. As shown, these two applications could lead to the selection of two very different positioning tables, even though the applied user load is the same 150 lbs (68 kg).

Example 1:

assembly needs to last 6 years
with
a 10 inch move out, then back 10 inches every 90 seconds
for
8 hours per day
for
5 days per week
and
50 weeks per year

$$\frac{(10 \times 2) \text{ inches}}{90 \text{ sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{8 \text{ hr}}{1 \text{ day}} \times \frac{5 \text{ days}}{1 \text{ week}} \times \frac{50 \text{ weeks}}{1 \text{ yr}} \times 6 \text{ years} = \mathbf{9,590,400} \text{ inches of travel}$$

Example 2:

assembly needs to last 8 years
with
(24) 1 inch moves out, then back 24 inches every 30 seconds
for
12 hours per day
for
7 days per week
and
52 weeks per year

$$\frac{(24 \times 2) \text{ inches}}{30 \text{ sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{12 \text{ hr}}{1 \text{ day}} \times \frac{7 \text{ days}}{1 \text{ week}} \times \frac{52 \text{ weeks}}{1 \text{ yr}} \times 8 \text{ years} = \mathbf{201,277,440} \text{ inches of travel}$$

Linear Bearing Load Capacities

Linear Bearing Load Capacities of a positioning table are specified with a static and dynamic value. These values are used to help select the proper table for a given load/life application. The use of adequate safety factors is a key element in the selection process of a linear bearing system for a given application. Selecting a system with no safety margin can lead to problems relating to performance and long term life.

Static Loads can exert an extreme force upon the linear bearing system in a non-moving state. If a static load rating of a particular linear bearing is exceeded, a localized permanent depression in the bearing and rail races could cause the system to not operate smoothly or fail prematurely.

Some static forces will be known and can be accounted for (i.e. drilling, insertion, stamping, engraving, etc.). Other unexpected forces that are difficult to determine could come from vibrations, impacts, or inertial forces. To ensure proper life, external forces should never come close to the static load rating. Repeated forces at or near the maximum rating can fatigue the elements causing premature failure. Thus, a safety factor should be considered to account for these forces. Also by using a safety factor, extra unforeseen loads that arise within an application sometime in the future, would not affect the positioning table chosen.

Recommended Linear Bearing Static Safety Factors

Operation Conditions	Loading Type	Min. Safety Factor
Stationary	No applied impact or vibration loads.	2.0 - 3.0
	Small impact or vibration loads are present.	3.0 - 4.0
	High impact or vibration loads are present.	4.0 - 6.0

Chart 1

Example 3:

Application calls for an external 1,500 lbs of force to be applied to a part (weight = 100 lbs) that is mounted to a positioning table. The table will be at rest. There will be a small impact to the part (and positioning table) as the force is first being applied.

From chart 1 - use a 3.5 factor

<i>total load</i>		<i>factor</i>		<i>select a table that has a static capacity greater than this value</i>
(1,500 + 100)	X	3.5	=	5,600 lbs

Dynamic Loads exert a force upon the linear bearings while the table is in motion. Every linear bearing (or carriage assembly) has a load capacity associated with it that is based upon the number of inches (or km) traveled. If the load applied to the carriage is less than the rated value at 2 million inches (50 km) of travel, the linear bearings will have a longer life associated with them that is exponential. Therefore, in order to select a positioning table that will last the required travel life in an application, the forces acting upon the linear bearings need to be reviewed. Once the force on the heaviest loaded bearing has been determined, and a proper safety factor selected, the life of that bearing (and carriage) can be determined by using a simple mathematical equation.

Safety factors should always be used when calculating the life of a linear bearing. Even though the forces acting upon a bearing (or carriage assembly) can be calculated, other parameters cannot. Changing loads, speeds, acceleration rates, environments and lack of lubrication produce extra forces (stresses) acting upon the linear bearings that are hard to quantify. As a positioning table moves, there are additional resultant loads as a by-product. The rate at which the table begins to move a load, can have a large impact on the life of a linear bearing. The linear bearings see this start/stop rate as a shock load each time. These and other variable loads cannot be calculated precisely. Thus, a safety factor should be applied to account for these loads which could fatigue the system and cause premature failure.

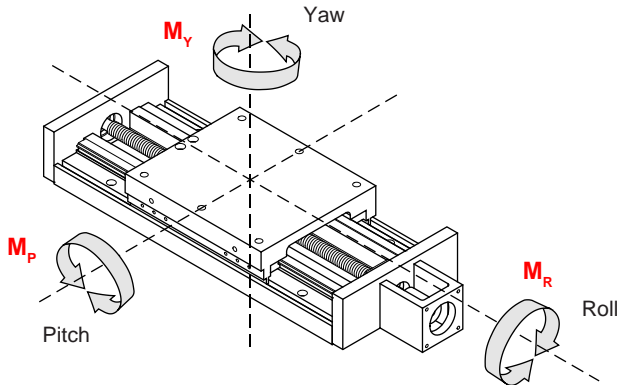
Recommended Linear Bearing Dynamic Safety Factors

Impacts or Vibration	Speed (in/sec)	Acceleration (G's)	Min. Safety Factor
None	< 5	< 0.25	1.0 - 2.0
Small	5 - 10	0.25 - 0.50	2.0 - 3.0
Medium	10 - 20	0.50 - 1.00	3.0 - 4.0
Large	20 - 50	1.00 - 1.50	4.0 - 6.0
Very Large	> 50	> 1.50	6.0 - 8.0

Chart 2

Linear Bearing Load Capacities - Continued

When the user load is applied to the carriage center, the forces acting upon each individual bearing are generally shared. However, if the load center of gravity is located away from the carriage center, a moment load has been created. These moment loads produce different forces acting upon the individual bearings within a table. Calculating precisely the exact forces acting upon an individual bearing in a moment load situation can be very involved. The equations on pages A-20 to A-22 can be used to estimate the forces acting upon an individual bearing, in a multiple rail and bearing table configuration. The chart on page A-19 was created by *LINTECH* as a means to quickly view the different load capacities for the positioning tables featured in this catalog. The ratings for Roll (M_R), Pitch (M_P), and Yaw (M_Y) for each table series are based upon the load center of gravity being located 12 inches (305 mm) from the carriage center. These ratings can be used as a general guideline for selecting a particular table for a given application.



Once the applied force acting upon an individual bearing (or carriage) has been determined, the following equations can be used to either determine the life, or the required load capacity, of a table series.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$R = \left[\frac{L}{B} \right]^{1/3} \times F \times S$$

- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8) see chart 2 on page A-17
- B** = either 2 (for millions of inches) or 50 (for Km)

Example 4:

Application calls for a screw driven horizontal application with a 30 lb load. The center of gravity of the load is located 18 inches perpendicular from the carriage center. Maximum speed is 4 inches/sec with an acceleration rate of 0.30 g's. There are no external impact loads. Would like a travel life of 150 million inches. Which table series should be considered?

- 1) From chart 2 on page A-17 - use a 2.5 safety factor
- 2) Find the M_R force for 30 lbs at 18 inches:

$$\frac{30 \times 18}{12} = 45 \text{ ft-lbs}$$

- 3) Use the following equation to find R:

$$R = \left[\frac{L}{B} \right]^{1/3} \times F \times S$$

$$R = \left[\frac{150}{2} \right]^{1/3} \times 45 \times 2.5$$

$$R = 474 \text{ ft-lbs}$$

- 4) From the chart on Page A-19 these tables should be considered:

Table Series	Dynamic M_R Capacity
150 4 bearing	575 ft-lbs
160 4 bearing	740 ft-lbs

Example 5:

Application calls for a screw driven horizontal application with a 75 lbs load mounted to the carriage center. Maximum speed is 8 inches/sec with an acceleration rate of 0.8 g's. There are no external impact loads. What would the estimated travel life be using a 2 bearing 100 table series?

- 1) From chart 2 on page A-17 - use a 4.0 safety factor
- 2) From the chart on page A-19 - Dynamic horizontal load capacity of 2 bearing 100 series at 2 million inches is 1,550 lbs.
- 3) Use the following equation to find L:

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$L = \left[\frac{1,550}{75 \times 4} \right]^3 \times 2$$

$$L = 276 \text{ million inches of travel}$$

Linear Bearing Load Capacities - Continued

Table Series	Carriage Length inches (mm)	# of Bearings	Static Capacity			Dynamic Capacity 2 million inches (50 km) of travel		
			Horizontal	M _R	M _P & M _V	Horizontal	M _R	M _P & M _V
			lbs (kg)	ft-lbs (N-m)	ft-lbs (N-m)	lbs (kg)	ft-lbs (N-m)	ft-lbs (N-m)
130	4 (102)	1	200 (90)	14 (19)	8 (10)	100 (45)	8 (11)	4 (5)
		2	400 (180)	28 (38)	30 (40)	200 (90)	16 (22)	15 (20)
100 110 120	4 (102)	2	2,360 (1070)	210 (285)	30 (41)	1,550 (703)	140 (190)	18 (24)
		4	4,720 (2140)	425 (576)	365 (495)	3,100 (1406)	280 (379)	240 (325)
90	6 (152)	4	5,000 (2268)	575 (780)	225 (305)	3,300 (1496)	380 (515)	150 (203)
	12 (305)	4	5,000 (2268)	575 (780)	790 (1071)	3,300 (1496)	380 (515)	525 (712)
150	4 (102)	2	3,400 (1542)	515 (698)	100 (136)	1,900 (862)	285 (386)	56 (76)
	8 (203)	4	6,800 (3084)	1,030 (1396)	1,255 (1702)	3,800 (1724)	575 (780)	700 (949)
160 170 180	6 (152)	2	4,200 (1905)	660 (895)	91 (123)	2,800 (1270)	370 (502)	51 (69)
		4	8,400 (3810)	1,320 (1790)	1,205 (1634)	5,600 (2540)	740 (1003)	670 (908)
200	6 (152)	2	7,600 (3447)	1,365 (1851)	300 (407)	4,400 (1996)	790 (1071)	175 (237)
	12 (305)	4	15,200 (6895)	2,730 (3701)	4,300 (5830)	8,800 (3992)	1,580 (2142)	2,485 (3369)
550	555	2	16,360 (7420)	285 (386)	845 (1145)	9,120 (4136)	172 (233)	510 (690)
	553 554	2	12,580 (5706)	590 (800)	1,750 (2370)	10,320 (4681)	475 (644)	1,425 (1932)
250	6 (152)	2	13,600 (6169)	2,715 (3681)	635 (861)	8,300 (3765)	1,655 (2244)	455 (617)
	12 (305)	4	27,200 (12338)	5,425 (7355)	6,450 (8745)	16,600 (7530)	3,310 (4488)	3,930 (5328)

Mean Bearing Load Calculation

When the force acting upon an individual bearing varies widely, as is the case with the bottom axis bearings of a multi-axes positioning table, a mean bearing load calculation can help determine the life of that bearing.

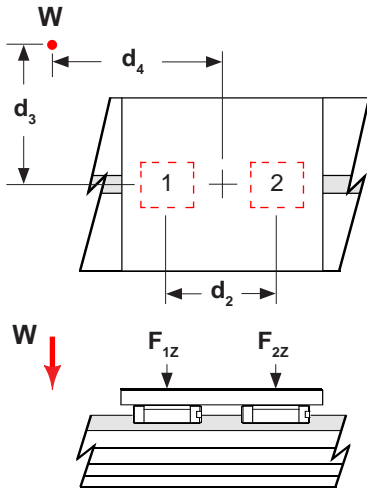
$$F_{avg} = \frac{1}{3} (F_{min} + 2 \times F_{max})$$

- F_{avg} - average force acting upon bearing (lbs or kg)
- F_{min} - minimum force acting upon bearing (lbs or kg)
- F_{max} - maximum force acting upon bearing (lbs or kg)

The equations below can be used to estimate the forces acting upon the linear bearings in a positioning table. These equations pertain to a positioning table which is at constant uniform velocity, or with the positioning table at rest. During acceleration and deceleration intervals of a positioning table, the force exerted upon an individual bearing changes as the acceleration or deceleration rate varies. In most cases, the extra force acting upon an individual bearing during the acceleration interval is offset by a reduced force during the deceleration interval. Therefore, using just the constant uniform velocity equations will adequately determine the life of an individual bearing for a particular application.

- d_1 - distance between centerlines of shafts or rails (in or mm)
- d_2 - distance between centerlines of bearing blocks (in or mm)
- d_3 - distance between carriage center and load center of gravity (in or mm)
- d_4 - distance between carriage center and load center of gravity (in or mm)
- d_r - distance between carriage surface and linear bearings (in or mm)
- C** - conversion from (inches to feet) (1/12) or (mm to meters) (1/1000)
- W** - load weight (lbs or kg)
- F_{BT}** - total force acting upon bearing (lbs or kg)
- F_{BX}** - force acting upon bearing in X-axis direction (lbs or kg)
- F_{BY}** - force acting upon bearing in Y-axis direction (lbs or kg)
- F_{BZ}** - force acting upon bearing in Z-axis direction (lbs or kg)
- F_(r)** - rated capacity of bearing at 2 million inches (50 km) (lbs or kg)
- M_{R(r)}** - rated roll moment capacity of carriage at 2 million inches (50 km) (ft-lbs or N-m)

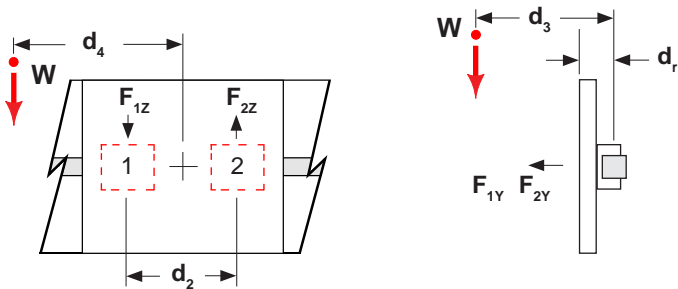
Horizontal Applications One (1) rail & two (2) bearings



$$F_{1z} = \frac{W}{2} + \left[W \times \frac{d_4}{d_2} \right] + F_{(r)} \times \left[\frac{W \times d_3 \times C}{M_{R(r)}} \right]$$

$$F_{2z} = \frac{W}{2} - \left[W \times \frac{d_4}{d_2} \right] + F_{(r)} \times \left[\frac{W \times d_3 \times C}{M_{R(r)}} \right]$$

Side Mounted Applications One (1) rail & two (2) bearings

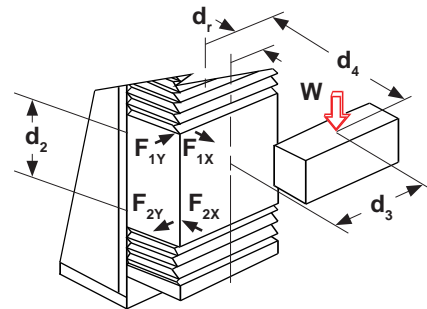


$$F_{1z} = \frac{W}{2} + \left[W \times \frac{d_4}{d_2} \right] \quad F_{1y} = F_{(r)} \times \left[\frac{W \times d_3 \times C}{M_{R(r)}} \right]$$

$$F_{2z} = \frac{W}{2} - \left[W \times \frac{d_4}{d_2} \right] \quad F_{1y} = F_{2y}$$

$$F_{1T} = F_{1z} + F_{1y}$$

Vertical Applications One (1) rail & two (2) bearings



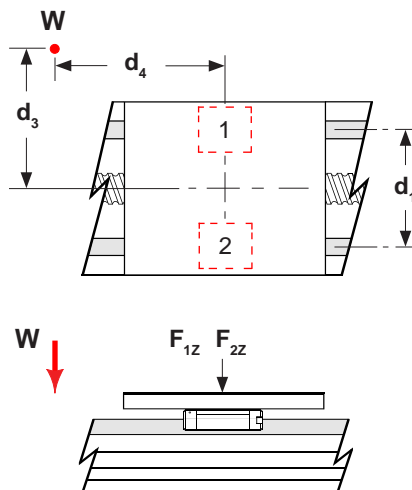
$$F_{1x} = F_{2x} = W \times \frac{d_4}{d_2} \quad F_{1y} = F_{2y} = W \times \frac{d_3}{d_2}$$

$$F_{1T} = F_{1x} + F_{1y}$$

The equations below can be used to estimate the forces acting upon the linear bearings in a positioning table. These equations pertain to a positioning table which is at constant uniform velocity, or with the positioning table at rest. During acceleration and deceleration intervals of a positioning table, the force exerted upon an individual bearing changes as the acceleration or deceleration rate varies. In most cases, the extra force acting upon an individual bearing during the acceleration interval is offset by a reduced force during the deceleration interval. Therefore, using just the constant uniform velocity equations will adequately determine the life of an individual bearing for a particular application.

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- F_{BZ} - force acting upon bearing in Z-axis direction (lbs or kg)
- $F_{P(t)}$ - rated capacity of bearing at 2 million inches (50 km) (lbs or kg)
- $M_{P(t)}$ - $M_{Y(t)}$ - rated pitch (or yaw) moment capacity of carriage at 2 million inches (50 km) (ft-lbs or N-m)

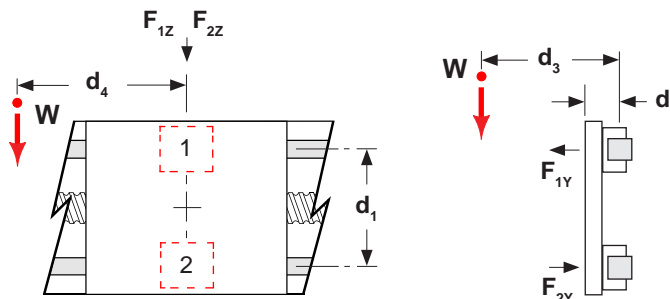
Horizontal Applications Two (2) rails & two (2) bearings



$$F_{1z} = \frac{W}{2} + \left[W \times \frac{d_3}{d_1} \right] + F_{(t)} \times \left[\frac{W \times d_4 \times C}{M_{P(t)}} \right]$$

$$F_{2z} = \frac{W}{2} - \left[W \times \frac{d_3}{d_1} \right] + F_{(t)} \times \left[\frac{W \times d_4 \times C}{M_{P(t)}} \right]$$

Side Mounted Applications Two (2) rails & two (2) bearings



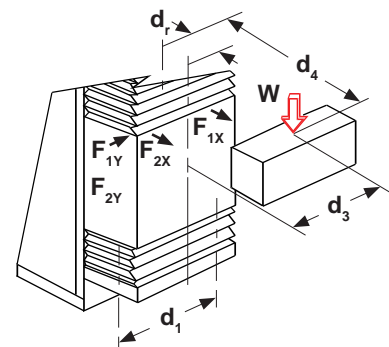
$$F_{1z} = F_{(t)} \times \left[\frac{W \times d_4 \times C}{M_{Y(t)}} \right]$$

$$F_{1y} = F_{2y} = W \times \frac{d_3}{d_1}$$

$$F_{1z} = F_{2z}$$

$$F_{1T} = F_{1z} + F_{1y}$$

Vertical Applications Two (2) rails & two (2) bearings



$$F_{1x} = F_{2x} = F_{(t)} \times \left[\frac{W \times d_4 \times C}{M_{P(t)}} \right]$$

$$F_{1T} = F_{1x} + F_{1y}$$

$$F_{1y} = F_{2y} = F_{(t)} \times \left[\frac{W \times d_3 \times C}{M_{Y(t)}} \right]$$

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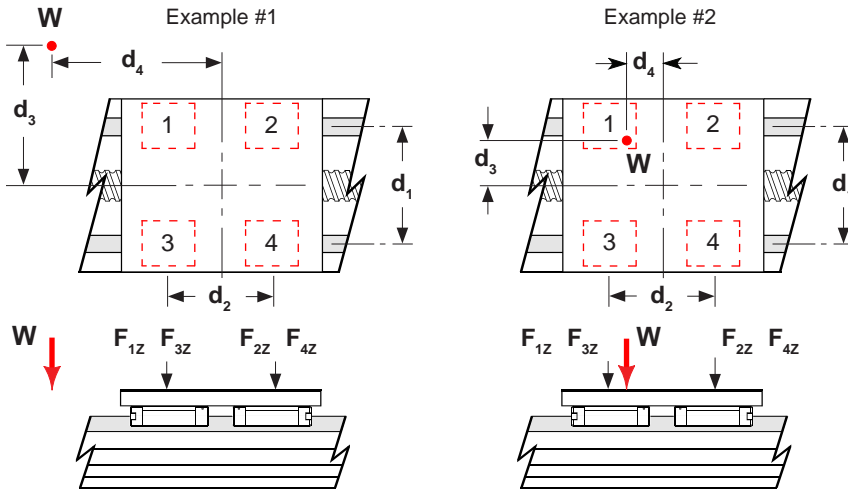
Toll Free Phone (877) SERV098
Toll Free Fax (877) SERV099
www.electromate.com
sales@electromate.com

The equations below can be used to estimate the forces acting upon the linear bearings in a positioning table. These equations pertain to a positioning table which is at constant uniform velocity, or with the positioning table at rest. During acceleration and deceleration intervals of a positioning table, the force exerted upon an individual bearing changes as the acceleration or deceleration rate varies. In most cases, the extra force acting upon an individual bearing during the acceleration interval is offset by a reduced force during the deceleration interval. Therefore, using just the constant uniform velocity equations will adequately determine the life of an individual bearing for a particular application.

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- d_4 - distance between carriage center and load center of gravity (in or mm)
- d_r - distance between carriage surface and linear bearings (in or mm)

- F_{BT} - total force acting upon bearing (lbs or kg)
- F_{BX} - force acting upon bearing in X-axis direction (lbs or kg)
- F_{BY} - force acting upon bearing in Y-axis direction (lbs or kg)
- F_{BZ} - force acting upon bearing in Z-axis direction (lbs or kg)
- M_{RB} - roll moment load acting upon a bearing (in-lbs or N-mm)
- M_{YB} - yaw moment load acting upon a bearing (in-lbs or N-mm)
- M_{PB} - pitch moment load acting upon a bearing (in-lbs or N-mm)
- W - load weight (lbs or kg)

Horizontal Applications Two (2) rails & four (4) bearings



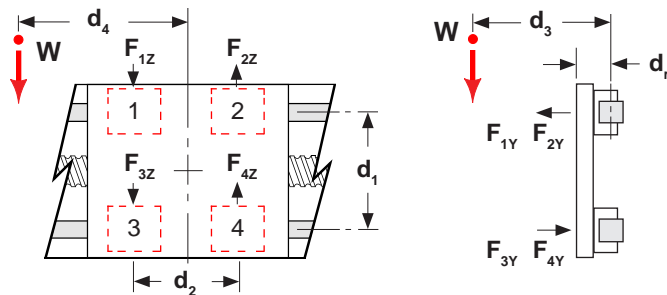
$$F_{1z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] + \left[\frac{W}{2} \times \frac{d_3}{d_1} \right]$$

$$F_{2z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] + \left[\frac{W}{2} \times \frac{d_3}{d_1} \right]$$

$$F_{3z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] - \left[\frac{W}{2} \times \frac{d_3}{d_1} \right]$$

$$F_{4z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] - \left[\frac{W}{2} \times \frac{d_3}{d_1} \right]$$

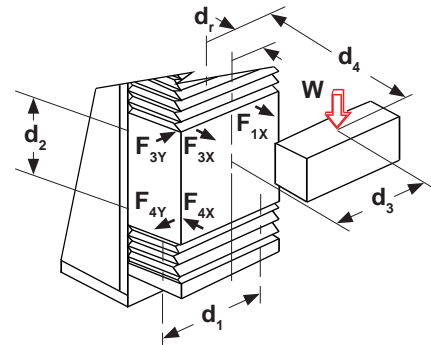
Side Mounted Applications Two (2) rails & four (4) bearings



$$F_{1z} = F_{3z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] \quad F_{1y} \sim F_{3y} = \left[\frac{W}{2} \times \frac{d_3}{d_1} \right]$$

$$F_{2z} = F_{4z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2} \right] \quad F_{1T} = F_{1z} + F_{1y}$$

Vertical Applications Two (2) rails & four (4) bearings



$$F_{1x} \sim F_{3x} = \frac{W}{2} \times \frac{d_4}{d_2} \quad F_{1y} \sim F_{3y} = \frac{W}{2} \times \frac{d_3}{d_2}$$

$$F_{1T} = F_{1x} + F_{1y}$$

Drive Mechanism Load Capacities

Linear positioning table drive mechanisms will have static and dynamic load capacity ratings for the acme screw, ball screw, and belt drive assembly. These values are used to help select a correct drive mechanism for a given load/life table application. For most **acme screw driven** positioning table applications, the screw (and not the linear bearing) is the major factor in determining the life of the table. This is due to the high friction of the nut assembly. For most **ball screw driven** positioning table applications, the linear bearing system (and not the screw) is the major factor in determining the life of the table. This is due to the high efficiency and high load capacity of the nut. For most **belt driven** positioning table applications, the linear bearing system (and not the belt) is the major factor in determining the life of the table. This is due in large part to the fact that belt driven tables usually travel lots of inches at high speeds. The use of adequate safety factors is a key element in the selection process of the drive mechanism for a given application. Selecting a system with no safety margin can lead to problems relating to performance and long term life.

The actual (axial) load a drive mechanism "sees" needs to be determined first. Then the effects of that load on the drive mechanism can be reviewed. For both **screw & belt driven** positioning tables, the actual load the drive mechanism experiences will vary as the table moves. During acceleration and deceleration intervals of a positioning table, the force exerted upon the drive mechanism changes as the acceleration or deceleration rate varies. In most cases, the extra force acting upon the drive mechanism during the acceleration interval is offset by a reduced force during the deceleration interval. Therefore, using just the forces acting upon the drive mechanism during constant velocity can be used. The applied (axial) load "as seen by the screw nut or belt" depends upon the table orientation. See the equations below.

Axial Load (as seen by the screw nut or belt)

<u>Horizontal Application</u>	<u>Vertical Application</u>
$F = (W \times \mu) + E$	$F = W + E$
E = externally applied extra forces	
F = applied axial load (as seen by the screw nut or belt)	
W = user mounted load weight	
μ = coefficient of friction for linear bearing system (0.01 for typical linear rail & bearing systems)	

Static Loads can exert an extreme force upon the drive assembly in a non-moving state. For **acme screw** driven tables, if the static load rating of a particular screw is exceeded, the nut assembly can permanently be deformed, or crack outright. For **ball screw** driven tables, if the static load rating of a particular screw is exceeded, a localized permanent depression in the screw shaft and ball nut could cause the system to not operate smoothly or fail prematurely. For **belt** driven tables, if the static load rating (maximum belt tensile force) of a particular belt is exceeded, the belt will permanently stretch, or tear. To ensure proper life, external forces should never come close to the static rating. Repeated forces at or near the maximum rating can fatigue the elements causing premature failure.

Some static forces will be known and can be accounted for (i.e. drilling, insertion, stamping, engraving, etc.). Other unexpected forces that are difficult to determine could come from vibrations, impacts, or inertial forces. To ensure proper life, external forces should never come close to the static rating. Repeated forces at or near the maximum rating can fatigue the elements causing premature failure. Thus, a safety factor should be considered to account for these forces. Also by using a safety factor, extra unforeseen loads that arise within an application sometime in the future, would not affect the positioning table chosen.

Recommended Screw Drive Assembly Static Safety Factors

Operation Conditions	Loading Type	Min. Safety Factor
Stationary	No applied impact or vibration loads.	1.5 - 2.0
	Small impact or vibration loads are present.	2.0 - 4.0
	High impact or vibration loads are present.	4.0 - 6.0

Chart 3

Example 6:

Application calls for a 100 lbs force to be applied to a part that is mounted to a screw driven Z axis (vertical) positioning table. The table will be at rest when the 100 lbs force is applied to the carriage. There will be no applied impact and there is no vibration. There is also 25 lbs worth of tooling hardware mounted to the table carriage.

From chart 3 - use a 2.0 factor

<i>total load</i>		<i>factor</i>		<i>select a screw that has a static capacity greater than this value</i>
(100 + 25)	X	2.0	=	250 lbs

Drive Mechanism Load Capacities - Continued

Dynamic loads exert an axial force upon the drive mechanism of a linear positioning table while the table is in motion.

The maximum axial force that a **belt driven** positioning table can handle is directly related to the maximum belt force capability of the belt & pulley assembly, which is determined by the belt material, belt width, and number of pulley teeth. Exceeding the maximum belt force capability will cause the belt to "skip" over pulley teeth (mis-position). Over time, continuous "skipping" of the belt over pulley teeth will weaken the belt, thus lowering the maximum belt force capability. The life of a belt & pulley drive mechanism will far exceed the life of a linear bearing system as long as the positioning table is operated below the maximum belt force capacity. See the individual table series sections for information on belt force capacities.

Every **ball screw driven** table has a load capacity associated with the nut that is based on the number of inches (or km) traveled. If the axial load applied to the nut is less than the rated value at 1 million inches (25 km) of travel, the nut will have a longer life associated with it that is exponential. With **acme screw driven** tables it is extremely difficult to accurately determine the life of the nut. Lubrication, speed, load, and environment all affect the wear of an acme screw. Increase of backlash & input torque, along with a decrease in system smoothness & position accuracy are all symptoms of acme screw wear. However, in some situations these symptoms may not immediately affect the application. *LINTECH* recommends the use of higher than normal safety factors within the screw life equations as a means to estimate the potential usable life of an acme screw.

The life of the screw nut may not be the limiting element for a given application. *LINTECH* offers a wide range of screw options for every table series. These screws provide different diameters, leads and load capacities. For some applications, the screw end support bearings may limit the life of a positioning table. See page A-25.

Safety factors should always be used when calculating the life of a screw assembly. Even though the forces acting upon a nut can be calculated, other parameters can not. Changing loads, speeds, acceleration rates, environments and lack of lubrication can produce extra forces acting upon the nut that are hard to quantify. As a positioning table moves, there are additional resultant loads as a by-product. The rate at which the table begins to move a load, can have a large impact on the life of a screw assembly. The screw will see this start/stop rate as a shock load each time. These and other variable loads cannot be calculated precisely. Thus, a safety factor should be applied to account for these loads which could fatigue the system and cause premature failure.

Once the applied axial force acting upon a nut has been determined, the equations below can be used to either determine the life, or the required load capacity.

Recommended Screw Drive Assembly Dynamic Safety Factors

Impacts or Vibration	Speed (in/sec)	Acceleration (G's)	Min. Safety Factor
	< 5	< 0.25	1.0 - 2.0
Small	5 - 10	0.25 - 0.50	2.0 - 3.0
Medium	10 - 20	0.50 - 1.00	3.0 - 4.0
Large	> 20	> 1	4.0 - 8.0

Chart 4

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$R = \left[\frac{L}{B} \right]^{1/3} \times F \times S$$

- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of nut at 1 million inches of travel or 25 Km (see screw specs in individual sections)
- F** = applied axial load (*as seen by the screw nut or belt*)
- S** = safety factor (1 to 8) see chart 4
- B** = either 1 (for millions of inches) or 25 (for Km)

Example 7:

Application calls for a screw driven, 6 inch travel vertical table with a 15 lbs load. Want to use an acme screw. Maximum speed is 4 inches/sec with an acceleration rate of 0.20 g's. Would like a travel life of 90 million inches. Find the required rated load capacity for the acme screw?

1) From chart 4 - use a 2.0 safety factor (**S= 2.0**)

2) From page A-23 for vertical loads:

$$F = 15 \text{ lbs}$$

3) Use the following equation to find R:

$$R = \left[\frac{L}{B} \right]^{1/3} \times F \times S$$

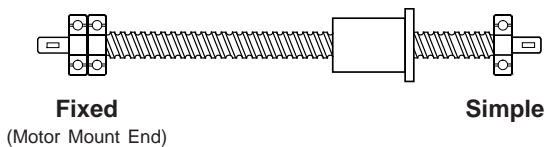
$$R = \left[\frac{90}{1} \right]^{1/3} \times 15 \times 2.0$$

$$R = 134 \text{ lbs}$$

4) Select an acme screw that has a dynamic load capacity greater than 134 lbs.

Screw Drive End Support Bearings

LINTECH uses sealed bearings in a fixed-simple configuration for end supports in screw driven positioning tables. The fixed-simple end support configuration eliminates end play of the screw shaft while supporting the ends of the screw. As *LINTECH* provides the use of a wide range of screws within each table series, the dynamic and static load capacity of the screw end support bearings also needs to be reviewed. In some cases, the limiting element of a screw assembly may be the end support bearing load capacity, and not the nut load capacity. See page A-24 for screw nut life/load information.



The axial (thrust) load that the screw end supports "see", can be derived by the same means as they were for the screw nut (see below). The use of safety factors here is also essential in determining the life of the end support bearings. The same hard to calculate dynamic & static forces that will act upon a nut will also act upon the end support bearings. Therefore, use the static safety factors in chart 3 (see page A-23) and the dynamic safety factors in chart 4 (see page A-24) when estimating the life of the end support bearings.

Axial (Thrust) Load (as seen by the screw end support bearings)

<u>Horizontal Application</u>	<u>Vertical Application</u>
$F = (W \times \mu) + E$	$F = W + E$
E = externally applied extra forces	
F = applied axial load (as seen by the bearings)	
W = user mounted load weight	
μ = coefficient of friction for linear bearing system (0.01 for typical linear rail & bearing systems)	

Once the applied axial force acting upon the screw end support bearings has been determined, the equations below can be used to either determine the life, or the required load capacity.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$R = \left[\frac{L}{B} \right]^{1/3} \times F \times S$$

- L** = calculated travel life (millions of screw revs)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see specs in individual sections)
- F** = applied axial load (as seen by the bearings)
- S** = safety factor (1 to 8) see chart 4 on page A-24
- B** = 2 (for millions of screw revolutions)

Example 8:

Want to use the rolled 0.500 diameter by 0.500 lead preloaded ball screw in a 100 series table in a vertical application. Maximum speed is 20 inches/sec with an acceleration rate of 0.50 g's. What would the maximum estimated travel life of the screw (or end supports) be for a 45 lbs load?

1) From chart 4 - use a 4.0 safety factor (**S= 4.0**)

2) For vertical application:

$$F = 45 \text{ lbs}$$

3) From 100 series table section found dynamic screw capacity to be 1,980 lbs for 1 million inches of travel. The load capacity of the screw end support bearings at the 1 million inches of travel ($1 / .500 = 2$ million screw revs) is 1,145 lbs. Therefore use 1,145 (and not 1,980) to estimate life of the screw assembly.

4) Use the following equation to find L:

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$L = \left[\frac{1145}{45 \times 4} \right]^3 \times 2$$

$$L = 514,000,000 \text{ screw revs}$$

or $\times 0.500$

$$= 257,000,000 \text{ inches of travel}$$

Rotary Table Load Capacities

The static & dynamic load capacities of the bearing in a rotary positioning table far exceed those of the worm gear assembly. Therefore, the load/life of a rotary positioning table will typically be determined by the usable life of the worm gear. The life of the worm gear assembly is extremely difficult to determine. Lubrication, input speed, load weight, environment, duty cycle, and excessive side (moment) loads all affect the operating nature of the precision worm gear assembly. The gears will physically wear over time due to the metal to metal contact (high friction) of the worm gear assembly. Increase of backlash & input torque, along with a decrease in system smoothness & position accuracy are all symptoms of worm gear wear. However, in some situations these symptoms may not immediately affect the application. The same equation used for linear bearing & screw assembly life can be used to estimate the life of a worm gear driven rotary table. This is only an estimation and the true operating life will depend on how the rotary table actually needs to perform in a given application. The use of a proper safety factor will help estimate the life of a rotary positioning table.

Recommended Screw Drive Assembly Dynamic Safety Factors

Impacts or Vibration	Input Speed (rev/sec)	Duty Cycle (%)	Min. Safety Factor
None	< 10	< 30	1.0 - 1.5
Small	10 - 20	30 - 40	1.5 - 2.0
Medium	20 - 25	40 - 50	2.0 - 2.5
Large	> 25	> 50	2.5 - 3.0

Chart 5

The following equation can be used to help estimate the life of a rotary positioning table for a given load.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- L** = calculated travel life of table top (millions of revs)
- R** = rated dynamic load capacity of table top at 1 million revolutions (see specs in 300 - 400 series section)
- F** = user applied load
- S** = safety factor (1 to 3)
- B** = 1 (for millions of table top revolutions)

Example 9:

Application calls for a user load of 25 lbs. Maximum input speed is 10 rev/sec, with a duty cycle of 40% . Find the estimated life using a 300 series (90:1) rotary positioning table?

- 1) From chart 5 - use a 2.0 safety factor (**S= 2.0**)
- 2) From page J-5 for 300 series table specs:

$$R = 225 \text{ lbs}$$

- 3) Use the following equation to find R:

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

$$L = \left[\frac{225}{25 \times 2} \right]^3 \times 1$$

$$R = 91 \text{ million table top revolutions}$$

Structural Load Capacities

The load capacity of a positioning table structure is directly related to the material of the table, the I value (moment of inertia) of the table, and how the positioning table is mounted (supported or unsupported) to the user structure.

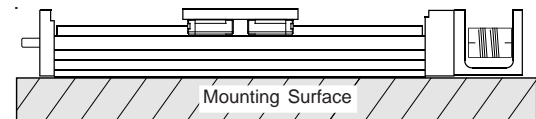
All standard *LINTECH* positioning tables are constructed using aluminum alloys. Aluminum is light weight, corrosion resistant, and quite stiff. All critical surfaces are precision machined to very tight tolerances, which produces a very accurate & repeatable positioning table. This includes table bases, linear bearing mounting surfaces, end plates, carriage assemblies, and other table support components.

The positioning table's I value (moment of inertia), the load, and the mounting configuration are main factors contributing to the deflection a table structure experiences for a given application. If a positioning table is fully supported over its entire length, and the proper safety factors for the linear bearing & drive mechanism are used, all standard *LINTECH* positioning tables will function properly. If a positioning table is mounted to a surface where the base is not fully supported, the table will experience a degree of deflection. If the deflection is too extreme, a positioning table will not function properly (usually binding occurs), and could fail outright. Increase of input torque required to move a load is usually the symptom encountered in applications with too much deflection.

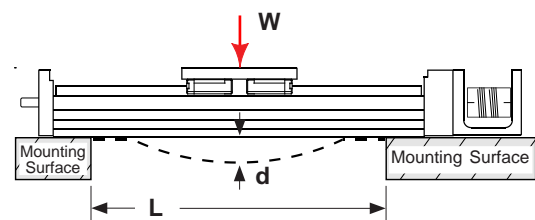
How much deflection is acceptable for a given table, mounted in a given configuration, is application dependent. For some high speed, screw driven applications too much deflection will cause the positioning table to stall.

Most positioning applications should have the table continuously supported by the user mounting surface. This helps to ensure trouble free operation. However, some applications call for end supported mounting configurations. The 100, 110, 120, and 130 series *LINTECH* positioning tables are widely used in end supported multi-axis applications where the "real world" deflection value may become a useful number. These numbers take into account deflections that cannot typically be calculated, such as multi-axis mounting hardware and table carriages. *LINTECH* provides these numbers in graph form in the respective table specification sections. These deflection numbers were actually measured and not calculated.

Below is deflection information on some of the more popular mounting configurations. It should be noted that the deflections shown are calculated, not actual. Actual deflection will also be a function of the user mounting surface and all hardware used to secure the positioning table to the surface.

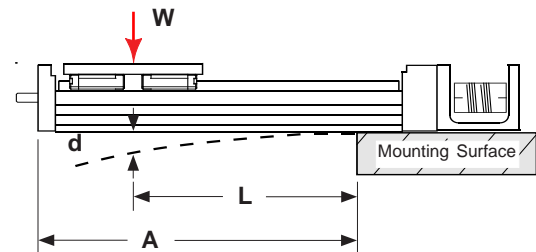


Continuously Supported



$$d = \frac{W \times L^3}{48 \times E \times I} + \frac{5 \times T \times L^4}{384 \times E \times I}$$

End Supported



$$d = \frac{W \times L^3}{3 \times E \times I} + \frac{T \times A^4}{8 \times E \times I}$$

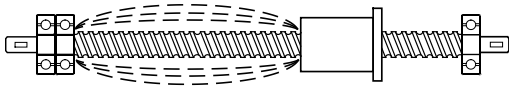
End Supported

- d** = deflection
- E** = modulus of elasticity
(aluminum = 10×10^6 PSI)
(steel = 30×10^6 PSI)
- I** = "moment of inertia" of table
- T** = weight of table per unit length
- W** = load weight

Maximum Speed

The maximum speed of a positioning table will either depend on the components of the bearing system or the drive mechanism assembly. Usually one or the other is the limiting factor. For **screw driven** linear positioning tables it usually is the screw assembly that limits its top speed. For **belt driven** linear positioning tables it is either the linear bearings, or the maximum belt force that limits the top speed. For rotary positioning tables it usually is the **worm gear** assembly that limits its top speed.

The maximum linear speed of a **screw driven** table depends on the screw diameter, length, lead, and end support housing configuration. For a given travel length increasing the screw diameter, or changing the screw lead can increase the positioning table linear velocity. This will come at the expense of increasing the torque required from the electronic motor/control system. *LINTECH* provides numerous screw options for each of its table series. The maximum speed information for all table travel lengths and optional screw combinations, is located in the individual table sections. Exceeding the maximum speed of a screw driven positioning table can cause a catastrophic failure, such as a deformed (bent) screw. This failure will more than likely produce a "rough running" system. Care should be taken to never exceed the maximum speed of a screw driven positioning table.



Maximum (critical) Speed

The maximum speed of a **belt driven** positioning table depends on the linear bearing system, and the forces the belt & pulley assembly can adequately handle. All of *LINTECH* belt driven tables use a recirculating square rail design for the linear bearings. The recirculating balls within the linear bearing block are moving at an incredible rate as the table moves. Exceeding the maximum speed of the linear bearings could cause the internal recirculating ball system to be damaged, which in turn could result in a rough running table or an outright failure. Before reaching these speeds however, the belt & pulley maximum force capabilities might be exceeded. The maximum linear forces that the belt can adequately handle are determined by the belt material, belt width, and the number of teeth on the pulleys. Exceeding the maximum belt force at a given speed will cause the belt to "skip" over the pulley teeth, thus causing mis-positioning of the table. Over time, continuous "skipping" of the belt over pulley teeth will weaken the belt, thus lowering the maximum belt force capability and maximum speed. Care should be taken to not exceed the maximum belt force capability. See the individual belt driven positioning table sections for information on the maximum speed of the linear bearings and the maximum belt & pulley force capabilities.

The maximum speed of a **worm gear driven** rotary table depends mainly on the worm gear assembly. The metal to metal contact of the worm gear will generate increasing heat as speed increases. If the speed (heat) gets too high, the worm gear will not only experience a great deal of wear, but also will require an increased amount of torque from the motor controller to move the table. The individual rotary table sections will list the maximum safe operating speed for a given rotary table.

Acceleration & Thrust Forces

As a positioning table starts motion with a given acceleration rate, a thrust force is generated ($F = MA$). This thrust force creates extra stresses on several components within a positioning table. Stresses are put on the linear bearing system, drive mechanism, carriage assembly, end plates, and the user mounting hardware.

The **maximum acceleration** rate for each table series is given in the individual technical sections. Exceeding this acceleration rate can cause immediate damage to a positioning table's components and should be avoided. An excessive acceleration rate can cause the recirculating ball network within the linear bearings (and/or a ball screw) to fail catastrophically. In a belt driven table, too high an acceleration rate can cause the belt to "skip" over the pulleys. This will cause the table to mis-position and can damage the belt. Maximum belt force capacity for a given belt driven positioning table is located in the individual table sections. Care should be taken to never exceed the maximum acceleration rate for a given table series.

In a perfect world, the axial thrust force ($F=MA$) created during the acceleration portion of a move should be added to the normal applied load a linear bearing (or screw assembly) sees. During the deceleration portion of a move, the axial thrust force would be subtracted from the normal applied load. Since these move distances are usually so short, and the fact that the increase in axial force during acceleration is offset by a reduction of axial force during deceleration, these forces are generally ignored. However, the shock load created during accel/decel intervals should not be ignored. Therefore, use the proper safety factor for acceleration when estimating the life of a linear bearing & screw drive mechanism.

Potential Thrust Forces

Screw & belt driven linear positioning tables are not normally thrust producing devices. They are not designed with the thought of producing thrust forces. However, that does not mean that they do not have the capability of producing a thrust force via an attached motor. The following equations convert rotary torque available from a motor into a linear axial thrust force. These become useful for those positioning applications that also require the table to generate a set amount of thrust.

Screw Driven Table

$$C = \frac{2 \pi e (T_M - T_T)}{d} \frac{\text{lb}}{(16 \text{ oz})} \quad (\text{lbs})$$

Belt Driven Table

$$C = \frac{g e (T_M - T_T)}{r} \frac{\text{lb}}{(16 \text{ oz})} \quad (\text{lbs})$$

- C** = potential axial thrust force (lbs)
- d** = screw lead (inches)
- e** = efficiency of screw or gearhead (90% = .9)
- g** = gearhead ratio (5:1 = 5)
- r** = radius of drive pulley (inches)
- T_M** = available motor torque at operating speed (oz-in)
- T_T** = torque required to move load (oz-in)

Example 10:

Application calls for a ball screw driven horizontal application with a 0.200 inch lead. Motor sizing has yielded torque requirements as follows: acceleration = 100 oz-in, constant speed = 20 oz-in, and deceleration = 80 oz-in. The maximum motor torque output at the desired speed is 250 oz-in. Find what axial thrust force is available for each move segment.

accel portion:

$$C = \frac{2 \pi \cdot 9 (250 - 100)}{.2} \frac{\text{lb}}{(16 \text{ oz})} = 265 \text{ lbs}$$

constant speed portion:

$$C = \frac{2 \pi \cdot 9 (250 - 20)}{.2} \frac{\text{lb}}{(16 \text{ oz})} = 406 \text{ lbs}$$

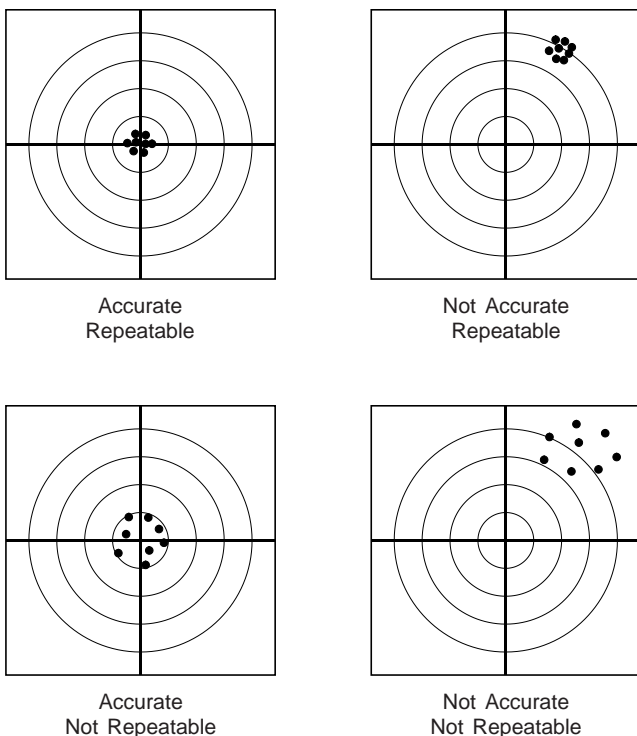
decel portion:

$$C = \frac{2 \pi \cdot 9 (250 - 80)}{.2} \frac{\text{lb}}{(16 \text{ oz})} = 300 \text{ lbs}$$

Accuracy

The difference between accuracy and repeatability is widely misunderstood. Accuracy in a positioning system is much harder to achieve than repeatability, and it is also more expensive to accomplish. Applications like *part INsertion*, *pick & place*, and *simple INSpection stations* require good repeatability, not necessarily accuracy. Why? Because once you have programmed the electronic motion controller & mechanical positioning table to position a load to a given location, you are typically more concerned as to how well the system can return to that location. Repeatability of the overall system becomes important for the application. The inaccuracies in the above systems can be offset by instructing the electronic motion controller to move a little bit more, or a little bit less. On the other hand *microscope XY INSpection stands*, *semiconductor wafer probING machINes*, and *coorDINate measurING machINes* require both good repeatability and high accuracy. Why? Because for these applications to be successful, they need to be very accurate (in the truest sense) when making a move from one location to another. Many positioning system applications in the real world require high repeatability, not necessarily high accuracy.

Accuracy is described as how well a positioning system makes a true relative move in reference to an absolute 3D location. In essence, if we lived in a perfect world, when a positioning system makes a 1.0 inch (25.4 mm) move, it truly moves 1.0 inches (25.4 mm). However, there are mechanical errors associated with every positioning system. These errors will cause the positioning system to be less than perfect when making moves. Move distances that will be something different than what were truly desired.



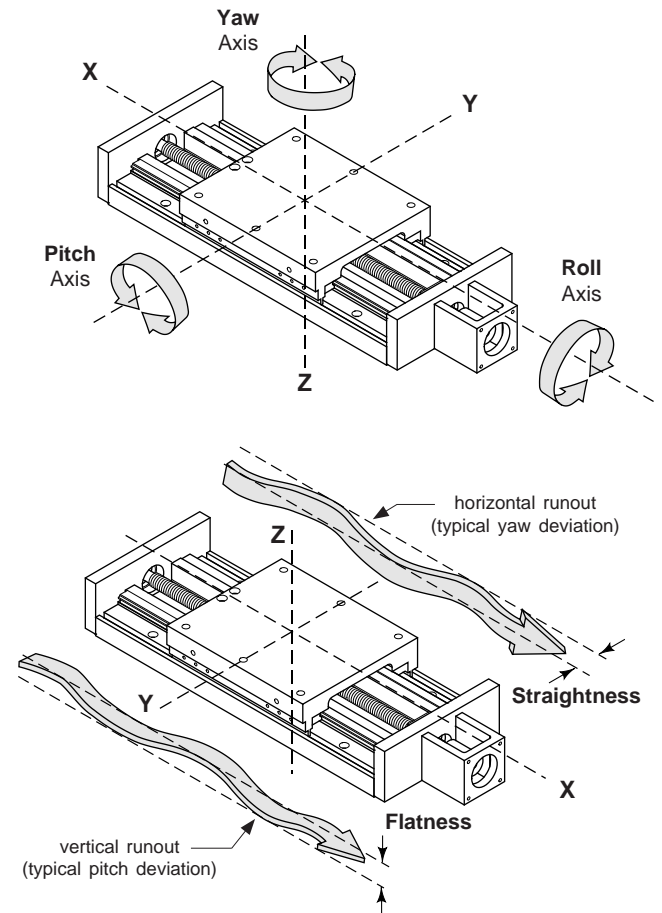
Instead of providing you with an in-depth discussion on each of these errors, we would like to give you just a little insight on each. Understanding that these errors exist will help you realize that every positioning system manufactured will exhibit some, or all, of these errors. Even systems you design yourself will have inaccuracies associated with it. **LINTECH** takes many steps to minimize these errors in our positioning tables, thus providing you with a cost effective, accurate, and repeatable positioning system.

Linear bearing & structure inaccuracies include:

- * angular (roll, pitch, & yaw)
- * vertical runout (flatness)
- * horizontal runout (straightness)

Some of the sources of these errors are:

- * straightness of the linear rail
- * entry & exit of recirculating balls in the linear bearings
- * variation of the preload when moving along the rails
- * contaminants between linear bearings & rails
- * machining of the rail mounting surface on the table
- * machining of the base, carriage, and other components



Linear Axis Bearing & Structure Errors

Accuracy - Continued

Linear bearing & structure inaccuracies will cause a positioning system to move something other than what is desired. *LINTECH* includes these errors in the overall "Position Accuracy" value described below. *LINTECH* also provides flatness & straightness specifications for each table series. These values can be used as a general gauge to the overall linear bearing & structural quality of a positioning table. The better these values are, the better the accuracy & repeatability of the positioning table will be.

Inaccuracies in the linear drive mechanism of a positioning table also contributes to its overall position accuracy. *LINTECH* provides acme screw, ball screw, and belt driven linear positioning tables.

Linear drive mechanism sources of errors include:

- * lead error of the screw
- * end support mounting of the screw
- * nut and screw quality & wear
- * lead error of the belt
- * belt stretch
- * end pulley quality & alignment

The lead error of the belt, or screw is a main factor affecting the accuracy of a positioning table. It is important to realize that these inaccuracies are not linear. These errors in fact are non-linear, and their value is typically given in the form of inches/foot (microns/300 mm).

Position accuracy is a value given by *LINTECH* for each single axis table series that can be used to estimate what the potential accuracy (or inaccuracy) will be for any given travel. Because *LINTECH* provides many different acme screw, ball screw, and belt drive options, along with many different standard table travel lengths, this position accuracy value is given in the form of inch/ft (microns/300 mm). This allows you to quickly estimate what the position accuracy might be for a given table series, linear bearing, drive screw (or belt), and travel length.

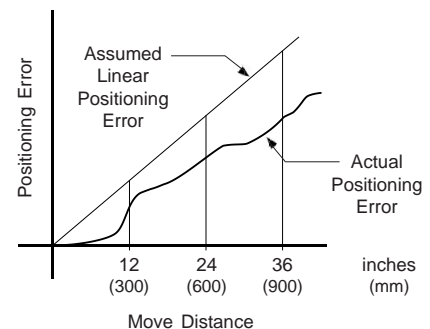
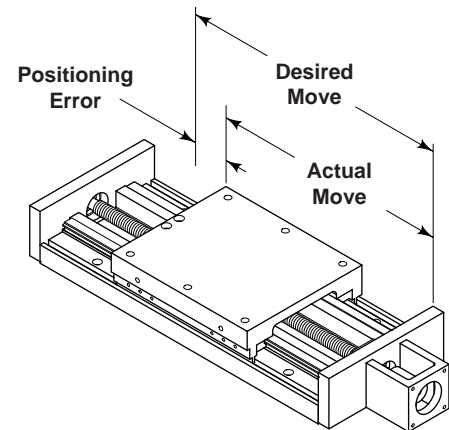
The key here is to realize that position accuracy is an estimation. Typically, no two positioning tables (even though they are manufactured with all the same components) will exhibit exactly the same position accuracy throughout their entire travels.

Testing (or mapping) of a given positioning table could be performed to determine what the true accuracy is over each inch of travel for a given system. However, this testing should be performed with the positioning table mounted in the user's application with all loads attached to the carriage. Position accuracy of a system can change based upon mounting surfaces, loads, and environment conditions which includes temperature.

For both screw and belt driven tables position accuracy is not a linear relationship. In fact, all the error within any 12 inch (300 mm) segment of travel could occur in say just 2 inches (50 mm). Also, the value in/ft error is a maximum (no worse than) value. Some 12 inch segments could have a value better than the stated position accuracy. Following is an example of the potential position accuracy for a given table.

* 48 inch travel table with a 0.003 in/ft position accuracy

Travel Length (inches)	Actual Error (inches)	Error Occurred Between (inches)	Total System Error (inches)
0 to 12	.002	2 to 5	.002
12 to 24	.001	7 to 9	.003
24 to 36	.003	1 to 6	.006
36 to 48	.001	4 to 11	.007



Accuracy - Continued

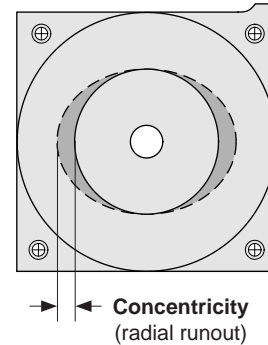
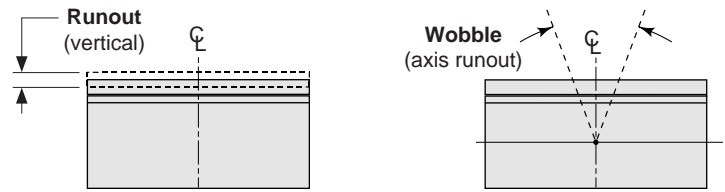
Rotary positioning table accuracies deal with the bearings that carry the load, the worm gear used to drive the load, and all associated precision machined components.

Runout is defined as the vertical deviation (inches or mm) measured throughout one full rotation of the table top. The 300 series rotary table has a precision option that provides a smaller runout deviation over the standard unit.

Wobble (axis runout) is defined as the angular variation from the true centerline of rotation throughout one full rotation of the table top. The 300 series rotary table has a precision option that provides a smaller angular variation over the standard unit.

Concentricity (radial runout) is defined as the deviation (inches or mm) between a perfect circle and the path the table top takes throughout one full rotation of the table top. The 300 series rotary table has a precision option that provides a smaller radial deviation over the standard unit.

Position accuracy of a rotary table is directly related to the precision machined worm gear assembly. The arc-second accuracy value is not dependent upon gear ratio. However, over time (wear of the worm gear) the accuracy can change depending upon the application.



Rotary Axis Errors

Repeatability

The repeatability of a positioning system is defined as how accurate, over successive move attempts, a table can return to a known, previously traveled location. The direction of travel can either be from one side (unidirectional), or from both sides (bidirectional). Highly repeatable systems (which may or may not be accurate) return to a known location with very little deviance from one move to the next.

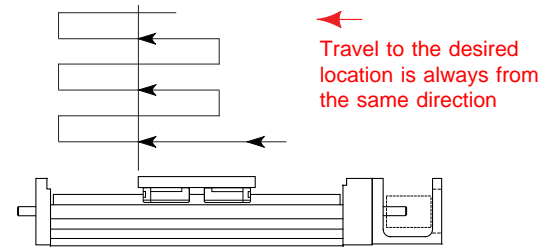
The bearings, table structure, operating environment, table orientation and the drive mechanism all play a part in the repeatability of a positioning table for a given application. Mounting high quality precision bearings to a precision machined table structure will help make a positioning system more repeatable. Operating a positioning table in an environment that has wide swings in temperature (and/or large vibrations), will adversely affect the repeatability of a system. Mounting a table in a vertical orientation has the benefit of eliminating (with no reversing force) backlash.

The drive mechanism can (and will) influence the repeatability of a positioning table. Using a higher accuracy grade screw for example will typically yield a better repeatability for the system. Besides playing a part in the unidirectional repeatability of a table, it can have a larger impact on the bidirectional value by dealing with backlash. Backlash in a **belt driven** positioning table consists of stretching, wear and tension of the belt, along with the individual manufacturing tolerances of the belt & pulley assembly. Backlash in a belt driven table is virtually impossible to eliminate. Backlash in a **screw driven** positioning table can be eliminated by using a preloaded nut assembly, thus the unidirectional & bidirectional repeatability will be the same. For applications requiring good bidirectional positioning, a preloaded nut assembly should always be used. Backlash in a worm gear assembly is also virtually impossible to eliminate. Therefore, to maintain a high level of repeatability, approach a known location from the same direction.

It should also be noted that the overall repeatability of a positioning table within a given application is highly dependent on the electronic motor/drive controller.

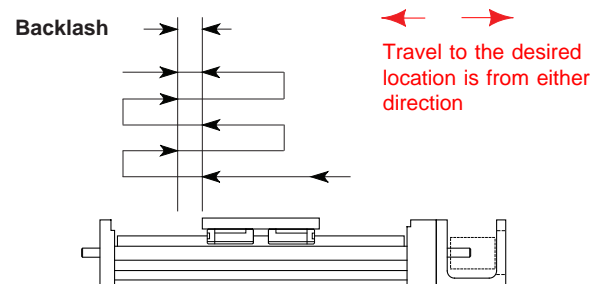
The majority of applications require a highly repeatable positioning system, and not necessarily an accurate one. Therefore, more attention should be given to the repeatability specification of a table than position accuracy.

Horizontal Applications - Unidirectional Repeatability



Horizontal Applications - Bidirectional Repeatability

(Unidirectional Repeatability + Backlash)



Vertical Applications (No reverse force)

Bidirectional Repeatability = Unidirectional Repeatability

Reverse Force

An upward force acting on a nut; such as when inserting a part (moving in a downward direction) into another part.

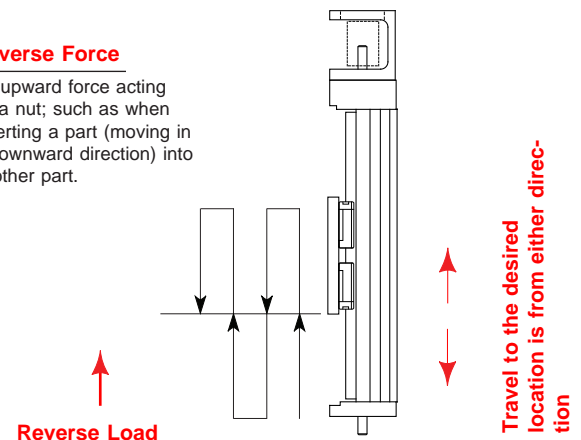


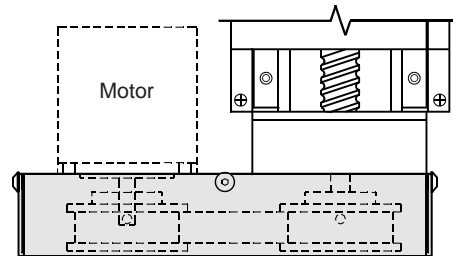
Table Size

The physical size of a positioning table can play a major role in the selection of a proper table for a given application. Besides the obvious height & width parameters of a positioning table, care should be given to the selection of the correct carriage size and travel length.

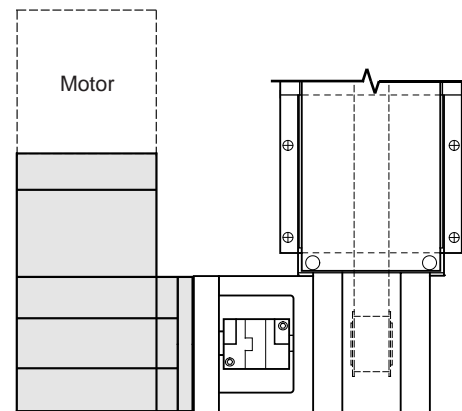
In most cases *LINTECH* provides **several carriage** options for a given table series. The carriage can be provided in either a 2 or 4 bearing version, with English inserts, Metric inserts or T-slots for load mounting. The 4 bearing carriage on some table series uses the same length carriage, while on others the length of the carriage is increased. In light (low moment) load applications using a 2 bearing carriage over a 4 bearing provides a cost savings. In applications where deflection of the attached user load is of concern, it is recommended that a positioning table with a 4 bearing carriage be selected, even though a 2 bearing carriage could handle the load/life requirement. While 2 bearing carriages offer a cost savings, 4 bearing carriages provide a much more rigid system. Therefore, for any moment load or high speed screw driven applications, four bearing carriages are recommended.

Selecting a positioning table with a **travel length** that is greater than what is required for an application is also recommended. *LINTECH* tables have their travel lengths rated "hard stop" (end plate) to "hard stop (end plate)". Therefore, when "end of travel" & "home" switches are used, the actual travel of the positioning table carriage is something less than the rated travel length. Also, when using a high speed drive mechanism, such as a high lead ball screw or belt drive, deceleration distance of the load should be considered. The position of the EOT (limit) switches must be placed so that the activation of a switch allows for sufficient distance to decelerate the carriage prior to contacting (hitting) an end plate (hard stop). Contacting the positioning table end plates will cause an impact load which increases with the speed of the impact. Having extra travel length to account for these distances, can help make for the successful selection of a positioning table for a given application.

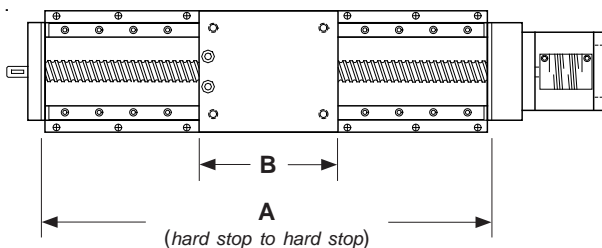
The **motor wrap** option that is offered for every screw driven table series allows the attached motor to be mounted parallel (along side) a positioning table. This will decrease the overall positioning system length, while increasing its width. The normal motor mount bracket is replaced with a zero backlash belt & pulley assembly. For belt driven positioning tables, using a right angle gearhead has the same effect of locating the motor along side the table.



Screw Driven Table with Motor Wrap



Belt Driven Table with Right Angle Gearhead



$$\text{Travel Length} = A - B$$

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Lubrication

Every *LINTECH* positioning table requires grease or oil for proper, long-term operation. Lubrication will dissipate heat, reduce friction, decrease system wear, and aids in preventing oxidation (rust) to those positioning table components that require protection. For most applications, a medium to heavy oil, light grease, or silicone based lubricant is recommended. The frequency of lubrication will ultimately be determined by the system application and table environment. Lack of lubrication could prevent a positioning table from reaching its normal expected (or calculated) life.

The many built-in pockets within the **linear bearings** that *LINTECH* uses, will allow the adhesive properties of most lubricants to be stored, and used by the recirculating balls for extended periods of time. Thus, as the positioning table moves back & forth, lubrication is applied to the linear rails. Most of the linear bearings have a lube port located on the bearing block (or carriage assembly) which allows for easy access to add lubricants.

Because **acme screw & turcite nut** screw driven positioning tables have a solid surface contacting a solid surface, sufficient lubrication becomes a must. If there is not proper lubrication, the high frictional forces of these nuts will cause excess wear to the assembly, thus preventing required positioning table life from occurring. Applying lubrication directly onto the entire length of the screw on a regular basis is highly recommended.

For **ball screw** driven positioning tables, the many built-in pockets within the nut assembly will allow the adhesive properties of most lubricants to be stored, and used by the recirculating balls for extended periods of time. Thus, as the positioning table moves back & forth, lubrication is applied to the ball screw. The nut assembly will pick up grease, or oil that is spread over the entire length of the screw. Therefore, applying lubrication directly onto the entire length of the screw on a regular basis is recommended.

High speed applications should NEVER have the linear bearings (or screw assembly) operate dry for any length of time. These applications can use grease or oil type lubrication. Grease is the preferred type since grease stays on the linear bearing rails & screw for longer periods of time. However for 24 hours a day, 7 days a week continuous operating applications, an automatic oil lubricating system may be required. For some low speed and lightly loaded applications, a linear bearing (and ball screw) assembly may be operated without lubrication. However, for the most part this is not recommended. Use of WD-40, or other cleaning solvents, should strictly be avoided, as they can cause damage to the linear bearings & drive screw nut.

Screw end support bearings and **belt pulley bearings** are sealed. Therefore, no lubrication is required for these components.

The **300 series rotary table** should have a lithium soap based grease #1 added to the worm gear assembly if the control system, or user, observes either an increase of input torque or a rough running table. These tables are equipped with a check-ball type grease fitting that supplies lubricant to the precision worm gear. Even though the rotary angular contact bearing is not completely sealed, the amount of grease packed into the assembly during manufacturing is sufficient for the life of the table.

The worm gear assembly and rotary bearing on the **400 series table** is not sealed. However, for most applications the grease which is packed into the assemblies during manufacturing is sufficient for the life of the table. Therefore, no lubrication is required.

Mounting Considerations

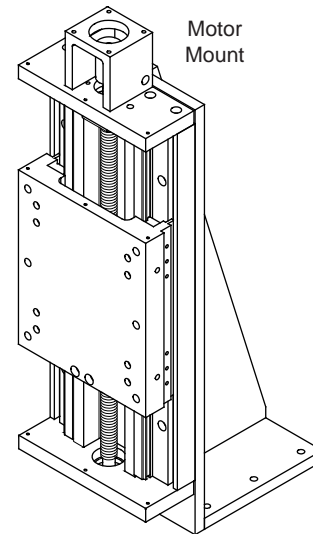
In order to achieve the published position accuracy & repeatability specifications of a *LINTECH* positioning table, care must be taken in mounting the table to the user surface. The mounting surface for the positioning table must be as flat, or flatter, than the positioning table itself (see flatness specification in individual table sections). If the surface is not, "shimming" will be required to achieve the published accuracy & repeatability specifications. Preparing the mounting surface properly ahead of time can prevent "shimming" later.

If possible, provide a mounting surface that supports the table over its entire base. This will minimize the potential for structural deflections as the load travels over unsupported regions. Deflections of the positioning table (and load) will occur for end supported mounting configurations. Too much deflection can cause the positioning table to bind or operate rough. (see page A-27). Use all of the **base mounting** holes (or as many as possible) to attach the table to the surface. Custom base mounting hole patterns are available upon request.

Positioning **table carriages** are either provided with stainless steel inserts (English or Metric threads), or with a T-slot for mounting of the user load. These carriages should not be modified or disassembled by the user. Special tools, equipment, assembly surfaces, and certain procedures are adhered to during the manufacturing of each positioning table. Dismantling of the carriage assembly from the table could alter the performance of the positioning table upon reassemble. It is recommended that an adapter plate be provided between the load and the carriage surface if the steel inserts (or T-slot) cannot be used directly. Custom carriage interfaces can be provided upon request. Also, the use of all the available carriage mounting holes for securing the load, helps minimize unwanted deflections and increase system rigidity. The moment load ratings within this catalog for a particular positioning table are based upon all the carriage inserts (and as many T-nuts as possible) are utilized to secure the load to the carriage.

For **vertical belt driven applications** there is no preference for the motor mount location. The motor mount can be located at the top or bottom of the positioning table. Due to the high efficiency of the belt drive mechanism a power-off brake is recommended. See page A-40.

For **vertical screw driven applications** it is recommended that the motor mount end of the positioning table be located up (above the carriage). This puts the screw assembly in tension as the fixed screw end support is located on the motor mount end. Mounting the table with the motor mount located on the bottom will put the screw assembly in compression. Having the screw assembly in tension (which is a load trying to stretch the screw) is preferred over a screw assembly in compression (which is a load & screw shaft weight trying to buckle the screw). Contact *LINTECH* for vertical applications requiring the motor mount to be located on the bottom of the table.



Vertical Axis (screw in tension)

Standard *LINTECH* positioning tables are designed to accept either an optional NEMA 23, 34 or 42 **motor mount** with either an English or Metric mounting interface. Metric (or other) motor mount options are available upon request. Some motor mounts could extend above and/or below a particular positioning table base. Preparing the user mounting surface ahead of time to deal with this extension could prevent frustration later. *LINTECH* has several available motor mount brackets which are designed for use with the optional motor couplings. The motor mounts and couplings are designed to fit within a given envelope. Each table series section lists the coupling dimensions that fit within a given motor mount. Care should be taken by the user when supplying their own motor bracket and/or coupling. Some "third party" couplings do not fit within some standard *LINTECH* motor mounts.

Some power-off brake, incremental encoder, or motor wrap options can extend above and/or below a particular table series base and/or increase the table width. Preparing the user mounting surface ahead of time to deal with these extensions is highly recommended.

Motor Couplings

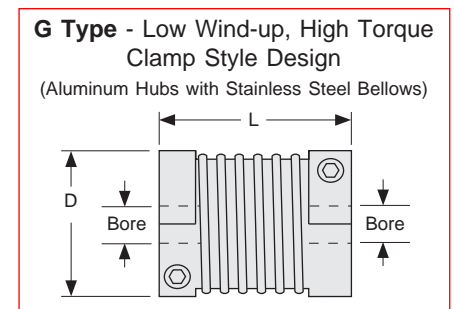
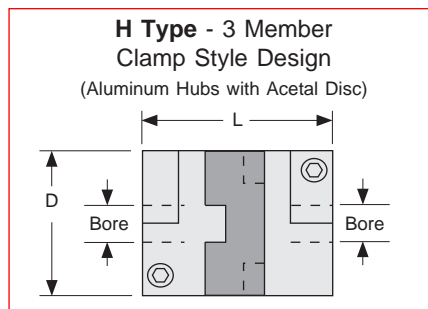
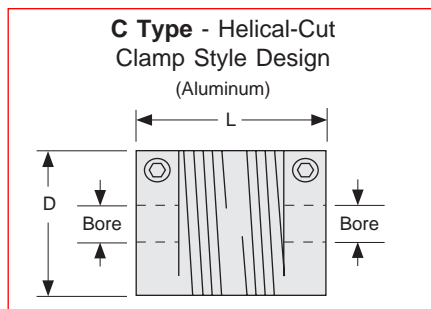
The main function of a coupling is to transmit the power generated by the attached motor to the screw, belt, or worm gear drive assembly. *LINTECH* provides three different types of couplings that can be used to attach a motor shaft to a positioning table. These couplings will compensate for some misalignment between the motor & table shafts. This provides for trouble-free operation as long as certain precautions are taken. First, the connected motor output torque should never exceed the coupling maximum torque capacity and a proper safety factor should be used. Second, select the proper coupling for a given application (see the charts below).

These couplings are typically not limited by speed, but they can be damaged (or weakened) over time in certain situations. Some of the more common situations are hitting a hard stop (or the positioning table end plates), servo systems that are tuned incorrectly, high acceleration rates, large back-driving vertical loads, use of gearheads, and moving large inertia loads. All of these situations should consider the use of a coupling with an adequate safety margin between

the coupling torque rating and the maximum motor (or gear-head) output torque. The main differences between the three couplings are wind-up (twist or torsional compliance), torque capacity, and cost. The chart below lists how the three types of couplings compare to each other.

When a coupling is subjected to torque it will twist. The amount of twist (deflection) for a given torque is wind-up. The higher the wind-up value of a coupling, the greater the "spring action" the coupling will exert between the motor & table shafts. This "spring action" can cause a high performing servo system to become unstable. Therefore, for servo motor applications a "G" or "H" style coupling with a low wind-up value should be considered.

LINTECH provides various diameter & length sizes for the "C", "H", and "G" style couplings. Each of these couplings are provided with an assortment of bore diameters to accommodate various NEMA & metric motor shafts. The individual sections will list all the coupling data available for a given table series.



Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

Recommended Coupling Maximum Torque Safety Factors

Impacts or Vibration	Speed (revs/sec)	Acceleration (G's)	Min. Safety Factor
None	< 2	< 0.10	1.8 - 2.0
Small	2 - 10	0.10 - 0.50	2.0 - 2.2
Medium	10 - 20	0.50 - 0.75	2.2 - 2.4
Large	20 - 50	0.75 - 1.00	2.4 - 2.6
Very Large	> 50	> 1.00	2.6 - 3.0

EOT (end of travel) & Home Switches

LINTECH provides several options for EOT & home switches for use on its positioning tables. One style uses mechanically actuated switches, while other styles use "non-contact" versions. Each switch is mounted to the base of the table, while the actuation cams are mounted to the carriage (or table top) assembly. The switches can be pre-wired by *LINTECH* for easy interfacing to the users electronic motor controller.

Linear positioning table **EOT (end of travel)** switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the base of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a fail-safe system, where the position controller can detect broken wires. *It is highly recommended that any positionINg table used with a position controller, should have end of travel switches INstalled for protection of personnel, table carriage, and user mounted load.*

The **home switch** can be utilized by a motion controller as a known fixed mechanical location on the positioning table. For linear positioning tables the switch is located near the motor mount end and is a normally open (NO) switch.

The **mechanical switch** option is reliable, repeatable, and does not require a power supply. The **reed switch** option is an inexpensive, non-contact, magnetically actuated solution for low repeatable applications that also does not require a power supply (ideal for belt drive applications). The **hall effect** switch option requires a +5 to +24 VDC power supply, but is a non-contact, magnetically actuated device which is repeatable. The **proximity switch** option is a non-contact, non-magnetic actuated device that requires a +12 to +24 VDC power supply. This option has a long activation area that can also be provided in either an NPN or PNP switch version. It is not possible to take a NPN switch and rewire it to be used as a PNP switch, as the NPN switch is internally different than a PNP switch.

Some table series have the switches located inside the positioning table, thus there is no additional width to the table. Other table series have the switches located along the side of the positioning table. In some cases there will be a slight increase in table width. See the individual table sections for information on EOT & home switches.

Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

Encoders

Linear and rotary incremental encoders can be mounted to most *LINTECH* positioning tables. These encoders provide a differential square wave A, B and Z (marker pulse), TTL signals (+ 5 VDC) that are compatible with most motion controllers.

Linear encoders can be mounted along side any screw driven positioning table. These incremental encoders are provided in either an English resolution (i.e. 0.0001 inch/pulse) or a Metric resolution (i.e. 1 micron/pulse). The encoder precision etched glass scale is packaged in an aluminum housing, which is mounted to the table base (or end plates) and is protected with seals (IP53) over the entire length of travel. The encoder read head is mounted to the table carriage and is supplied with a high flex, shielded 10 foot (3 m) cable that is terminated to a 12 pin DIN connector. There is a mating DIN connector supplied for easy wiring to the motor control system. The linear encoder option is ideal for those applications where closed loop positioning is required. The attached motor (stepper or servo) & controller will move the table until a set amount of encoder pulses has been recorded by the position controller. The process of positioning to the encoder (closed loop) in an application, eliminates positioning problems due to screw lead errors, coupling wind-up, mechanical backlash, and unexpected motor stalls. In order to position to 1 pulse of an encoder the motor/screw resolution needs to be 4 times greater than the encoder resolution. For example:

- * using a 0.0001 inch/pulse encoder
- * with a 0.200 inch/rev ball screw
- * requires motor/controller with minimum resolution of:

$$\frac{.200 \text{ in}}{\text{rev}} \times \frac{\text{pulse}}{.0001 \text{ in}} \times 4 = 8000 \text{ pulses/rev}$$

This resolution ratio of the motor/drive/table versus encoder will help prevent "dithering" over 1 encoder count. In some cases, positioning to a specific encoder count location may not occur due to table friction (stiction), screw accuracy grade, applied load, wind-up in a coupling, motor output torque, and tuning of a servo system among others. By using a well lubricated system, high accuracy grade screw, coupling with minimal wind-up, and a high resolution motor/drive controller will help ensure success. It should be noted that using a linear encoder does not always increase the positioning table accuracy to that of the linear encoder. Even though the linear encoder can compensate for the lead error of a screw, it cannot compensate for straightness, flatness, and angular errors of the table bearings and structure. Also, cosine errors (misalignment of encoder to direction of travel) and Abbe errors (offset distance between encoder read head & carriage top) will play a large factor on overall linear positioning accuracy.

Even though these linear encoders can operate at a maximum speed of 79 inches/sec (3 m/sec), installing them on a belt driven positioning table is not recommended. The motor/table to encoder 4:1 require resolution ratio is difficult to achieve due to the belt drive lead (3.5 inch/rev). This means that in most applications the motor controller will try to position to an encoder pulse that it never can reach, thus encoder "dithering". Even if it were possible to get to a 4:1 resolution ratio, the inaccuracies & stiction of the belt & pulley system could also cause encoder "dither".

Linear encoders with different resolutions, or special linear encoders for high temperature, vibration, and environmental challenging applications are available upon request.

Rotary encoders can be mounted to any screw or belt driven positioning table. These incremental encoders are provided in resolutions of 500, 1000 and 1270 lines/rev. The encoder precision etched glass disk is mounted to the screw, or belt & pulley, shaft extension and has a plastic protective cover. The shielded 10 foot (3 m) cable can easily be connected to most motion controllers or digital position displays. Positioning to a rotary encoder will compensate for errors in coupling & gearhead components. However, rotary encoders will not compensate for linear positioning errors within the screw & belt drive mechanisms. Rotary encoders are ideal for applications where an operator requires positional data via a digital display, or where detecting the stall of a carriage assembly is important.

See the individual table sections for linear & rotary encoder specifications, wiring information and mounting orientation.

Power-Off Brakes

For vertical positioning table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the table. Screw driven tables will have the brake mounted to the screw shaft extension located on the table end opposite the motor mount bracket. Belt driven tables will have the brake mounted to the thru drive shaft option. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

Acme screws, with their inherent high frictional forces, do not usually back-drive. Therefore, they are ideal for vertical applications. When motor power is removed, the acme screw will usually hold the user load in place. Therefore, a power-off brake is usually not required. However, for applications experiencing a large amount of vibrations, it is not uncommon to see a brake mounted to an acme screw driven table. These external vibrations could cause the acme screw nut (carriage) to creep, or move unexpectedly.

Ball screws are ideal for long life, high speed vertical positioning applications. However, because of their high efficiency, when motor power is removed, the user mounted load can force the positioning table to back-drive. Damage to surrounding equipment, or personnel can occur. Therefore, it is highly recommended that a power-off brake be installed to the positioning table. By applying the brake to the screw shaft when motor power is removed, the carriage (load) will firmly be held in place as long as the applied force does not exceed the rating of the brake.

Belt driven positioning tables are also ideal for some high speed vertical applications. The belt drive design provides for a very efficient system. Thus when motor power is removed, the user mounted load can back-drive very rapidly, causing a potentially dangerous situation. The use of a power-off brake should always be installed in these situations. The power-off brake is also recommended in those horizontal applications where an external force can move the carriage due to the highly efficient belt & pulley drive system.

The brake comes with two wires for power (24 or 90 VDC). Any DC power supply with ample current output can be used to power these brakes. *LINTECH* does provide 4 different optional power supplies that are designed for use with power-off brakes. The wires should be directly connected to an external power supply, or user supplied relay network. For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. In most cases, your motor drive and brake power should come from the same source, thus when the drive loses power, so will the brake. For stepper & servo systems, further interfacing is required to ensure power-off braking occurs if a motor stalls or there is a drive fault. For step motor systems, the addition of an encoder in the system can help detect system stalls, which can then engage the brake and prevent back-driving of the load. Servo systems usually have some sort of fault signal output which can be used to engage the brake in the case of a system stall.

This power-off electric brake SHOULD NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake. On some complete system "power up" situations, it may be necessary that power to the brake be delayed several seconds over the power which is applied to the motor/control system. This allows time for torque to be built up in the motor/control before the brake is released, thus potentially preventing the load from falling on total system power-ups.

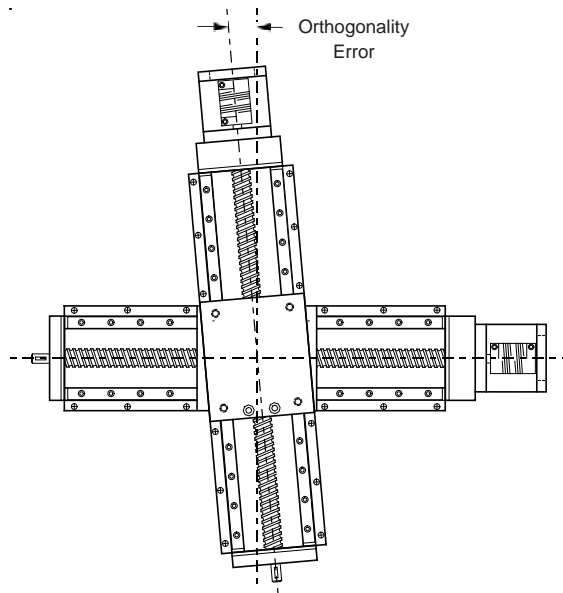
See the individual table sections for power-off brake mounting orientation and dimensions.

Brake Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)
B03	84 (9,5)	24 VDC	0.973	3.3 (1,50)
B04	84 (9,5)	90 VDC	0.239	3.3 (1,50)
B05	180 (20,3)	24 VDC	1.136	4.5 (2,04)
B06	180 (20,3)	90 VDC	0.287	1.4 (2,04)

Multi-Axis

LINTECH has manufactured numerous multi-axis positioning systems for use in a wide variety of applications. X-Y, X-Z, and X-Y-Z multi-axis systems can be created in a variety of ways. *LINTECH* offers base to carriage, carriage to carriage, the use of horizontal & vertical angle brackets, and the integration of different table series to create various multi-axis positioning systems.

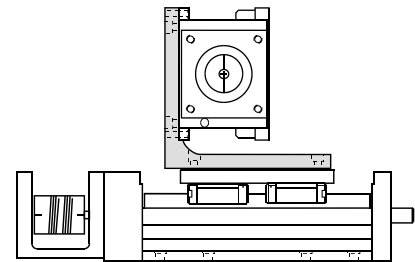
The most common X-Y mounting configuration is obtained by stacking two single axis tables on top of each other. The base of the top (Y axis) is mounted to the carriage of the bottom (X axis). Any time a multi-axis system is created by stacking of tables, the bottom axis (or axes) will have several application considerations that need to be reviewed. First, the bottom axis will experience moment loads that are generated by the top axis moving. These moment loads will vary, and the mean load equation on page A-19 can help to determine the forces exerted on the bottom axes bearings. For the majority of applications, a 4 bearing carriage should always be considered for any bottom axis. Second, additional errors are introduced into the system, such as orthogonality and stack up errors. Orthogonality is the maximum deviation from perpendicularity between 2 axes. Stack up errors are angular errors transmitted from the bottom axes to the top axis.



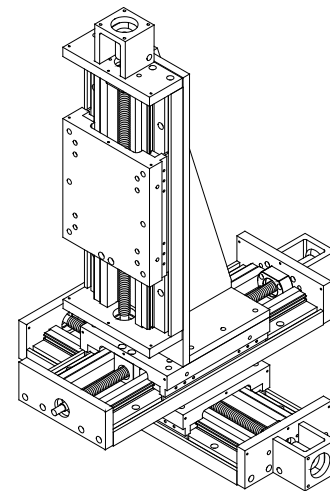
X-Y Axis Orthogonality

Another X-Y mounting solution has a spread rail configuration mounted to a base plate for the X axis. This generates more uniform forces on the bottom axis bearings, while also minimizing system deflections.

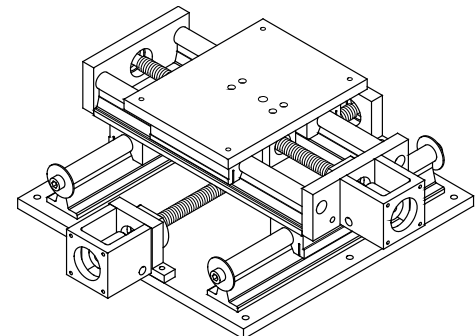
Some standard table series within this catalog can easily be constructed into a multi-axis arrangements. The 100, 110, 120, 130, 170, 180 and 550 either have base & carriage mounting hole patterns that match each other, or a selection of adapter plates & angle brackets that make creating a multi-axis assembly easy. See the individual table sections for more details. Other standard table series can have the top axis mounted to the bottom axis by adding new mounting holes in the bottom axis carriage. Contact *LINTECH* for more details.



X-Y System with Horizontal Angle Bracket



X-Y-Z System with Vertical Angle Bracket



X-Y System with Spread Rail X axis Base Plate

Environments

The life and performance of a positioning table is highly dependent upon its operating environment. Premature failure of a positioning table can occur if it is not designed to operate within the environment in which it is installed.

Standard *LINTECH* positioning tables within this catalog are designed to operate in most general industrial environments. The normal operating temperature can vary between 0° F to +185° F (-18° C to +85° C), while the general surrounding environment should be free of moisture, fine dust and corrosive chemicals. All aluminum components used in standard positioning tables are either black or clear anodized. All steel components (such as linear bearings & screws) require a level of lubrication to help prevent oxidation (rusting).

Aluminum cover plates are offered as an option on some belt & screw driven positioning tables. These covers protect the linear bearings and drive mechanism from falling objects, while they also help protect operating personnel from some moving table components by minimizing "pinch points". Hypalon polyester, neoprene coated polyurethane, and nylon/PVC waycovers (bellows) are also offered as an option on some belt & screw driven positioning tables. These covers significantly increase the protection of the linear bearings and drive mechanism from liquid mists and airborne particulates.

Operating a positioning table in certain environments may require the use of special materials within the system. *LINTECH* can modify a standard table to operate in many different environments. Contact us with your special needs.

Clean Room Environments call for the removal of all (or most) particle generating components within a positioning table. Depending on the clean room requirement (class 100, 10 etc.), seals, plastics, wipers, and waycovers may need to be removed or replaced with special materials. The use of chrome plated or stainless steel hardware, along with special clean room lubricants will be required.

Corrosive Environments require chrome plated or stainless steel hardware to protect the linear bearing & drive mechanism, along with special lubricants that will operate within the application.

Dusty Environments will require waycovers to protect the linear bearing & drive mechanism from getting "gummed" up. For applications involving particulate contamination, a positive air pressure under the waycovers may be required.

High/Low Temperature Environments may require special linear bearings or drive mechanisms, along with special lubricants.

Vacuum Rated Environments down to 10⁻⁷ torr are possible by removing all rubber & plastic materials, along with all paint and grease from table surfaces. Vacuum compatible lubricants, special insulated cabling, and special plated materials may be required.

Wash Down Environments require chrome plated or stainless steel hardware to protect the linear bearing & drive mechanism, along with special lubricants that will operate within the application.

Welding Environments may require the use of special telescoping steel (or fire proof) waycovers to protect the linear bearing and drive mechanism from hot debris.

Testing

All standard *LINTECH* positioning tables in this catalog use precision components that are manufactured to tight tolerances. Special tools, equipment, assembly surfaces, and certain procedures are adhered to during the manufacturing process. Each individual table manufactured will meet or exceed listed specifications based on the following requirements.

First, the proper table has been selected using the recommended safety factors for the applied load. Second, the positioning table is properly mounted to the user structure based on flatness & deflection guidelines. Third, the positioning table is operated by a motion controller that will not exceed listed maximum speeds and/or prevents a system from crashing.

Testing by *LINTECH* on a given positioning table can be performed to yield information for:

- * repeatability
- * position accuracy
- * straightness
- * flatness
- * other requested user data

All testing is performed by *LINTECH* unloaded and in a controlled environment. Test results are provided via a written report. The cost of testing a positioning table depends on the data required, table series, and travel length. Contact *LINTECH* for costs associated with the testing of a given positioning table. Also, the testing of a positioning table could add from 1 to 2 weeks to the normal delivery time.

It should be noted that *LINTECH* believes testing & verifying the true performance of any positioning table, for a specific application, should be done within the confines of the user's system and not in a controlled environment. Having *LINTECH* test a system that is not mounted to the applications final machine structure, without the exact applied load & motion controller, and without the final operating environment, will yield test results that could be irrelevant. Therefore, for a majority of positioning system applications *LINTECH* recommends testing to be done at the user's facility.

Custom Systems

LINTECH has been manufacturing custom positioning systems for use in a wide variety of applications for over 30 years. See pages A-4 to A-7. Some of these custom systems have been simple modifications of carriage assemblies, special base mounting hole patterns, nonstandard travel lengths, specific motor mount brackets, or different accessories such as couplings, encoders, or waycovers.

Other more involved custom systems have been:

- * 30 x 30 x 30 foot X-Y-Z inspection stations
- * 60 foot part placement machines
- * 5,000 pound load capacity assembly stations.
- * vacuum or wash down rated
- * 9 axis special assembly machines

All of these custom systems were successful by following a simple approach.

Review, fill out, and provide all the information on the application guide on page A-45. Providing us with all, or as much detail up front, can lead to the successful completion of a custom system. Then submit this information to *LINTECH* and we will review the data, to see if it is within our capabilities to manufacture.

Some of the more important information to provide us follows:

Budget will become extremely important in our evaluation process with you. With our many years of experience building custom systems we will be able to determine if the required performance you are seeking is possible within your budget.

Accuracy or Repeatability will make a big difference in the cost of a custom system. The accuracy of 0.0002 inches over 48 inches of travel will cost a whole lot more than a repeatability of 0.0002 inches over the same 48 inches of travel.

Load Weight will have an impact on the linear bearing, drive assembly, and structure that we would design for the custom system. Providing a realistic estimated of load weight (along with any other potential external forces), without too much of a safety factor will help select the proper custom positioning components. We will use the proper safety factors based on your application details.

Required System Life will also affect the selection of the proper components for the system.

Systems Speeds may affect the cost of a custom system if larger, more expensive components are required to meet the application needs. Providing us with a realistic target speed helps create a successful custom system.

Application Sketch (or diagram) can help minimize the time for us to respond to your request.

Other Details such as waycovers, motor mounts, or carriage size may not seem like key items to mention. However, providing us with as much information on the application requirements will lead to the successful completion of a custom system.

Design Considerations

Application Guide

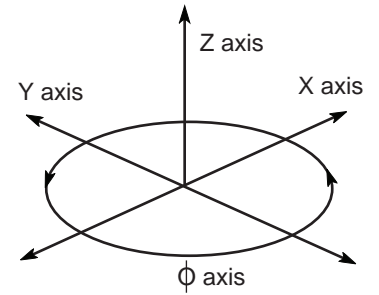
Name _____ Date _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone () _____ Fax () _____



Positioning System Specifications Budget (per system) _____

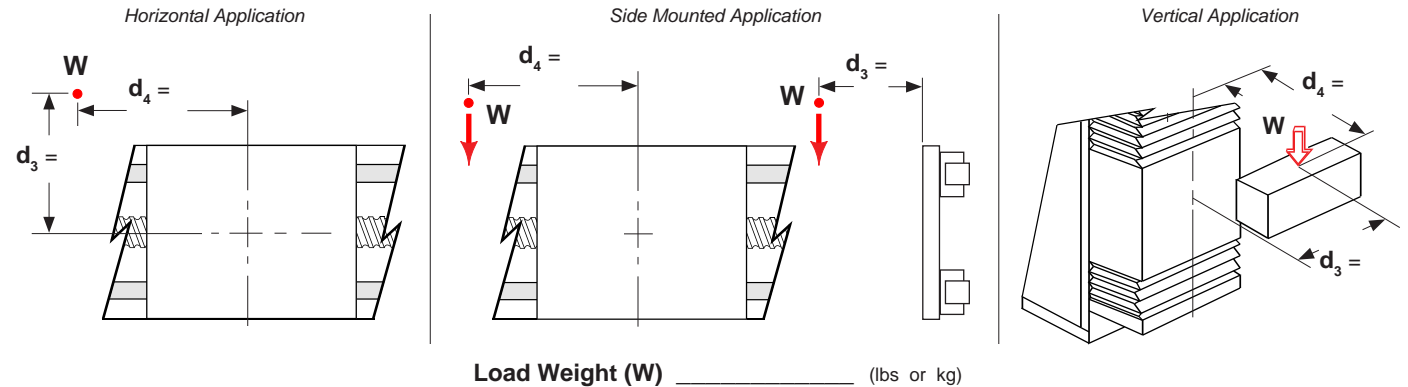
Axis	X	Y	Z	Φ	Axis	X	Y	Z	Φ
Carriage Size length x width (in or mm)					Maximum Accel (in/sec ² or m/sec ²)				
Travel Length (in or mm)					Duty Cycle (%)				
Load Weight (lbs or kg)					Table Life (millions of inches or Km)				
Repeatability (in or mm)					Motor Frame Size (NEMA 23, 34, 42, other)				
Accuracy (Overall - in or mm)					Limit Switch Type (mech, reed, hall, prox)				
Maximum Speed (in/sec or mm/sec)					Waycovers (Yes or No)				
Most Difficult Move Profile	Distance (in or mm)				Encoder (linear, rotary, & resolution)				
	Time (sec)					Power-off Brake (Yes or No)			

Special Requirements

High Temperature Clean Room Maximum Smoothness Motor Wrap
 Vacuum Rated High Moisture Low Audible Noise Other (explain below)

Moment Loads

Load Center of Gravity Distance from Carriage Center (in or mm)



Application Details (please describe and attach separate sketch if required)

Torque Requirements

The torque required to move a *LINTECH* positioning table for a specific application requires the calculation of several simple equations. These equations require you to evaluate carriage speeds, acceleration rates, and load weights. Careful torque calculations allow the proper selection of an electronic motor/drive system.

The maximum torque demand from any motor is usually during the acceleration portion of a move profile and consists of several parts - Acceleration Torque, Friction Torque, Breakaway Torque, and for vertical applications the Torque to overcome Gravity.

The torque required from a motor varies as the move profile changes from acceleration to constant velocity to deceleration. Constant velocity torque and deceleration torque become important when sizing for a servo motor system. Torque to overcome gravity becomes extremely important in vertical applications. The upward move places the highest torque demand on the motor, while the downward move sometimes requires the motor/drive system to act as a

Step Motors

When sizing for a step motor system, calculate the maximum torque demand for the application. This will usually be the total torque required during the acceleration portion of a move profile. Select an electronic motor/drive system which will deliver more torque than is absolutely required. This torque margin accommodates mechanical wear, extra loads, lubricant hardening, and other unexpected factors. Consult the individual motor manufacturer for details on their required torque margin and inertia matching.

Servo Motors

When sizing for a servo motor system, two calculations must be performed - maximum (peak) torque and RMS (continuous) torque. The maximum torque demand for the application will usually occur during the acceleration portion of a move profile. The RMS torque calculation will require values for acceleration torque, constant velocity torque, deceleration torque, and the time between move profiles. All servo motor systems have a peak and continuous torque rating. Select an electronic motor/drive system which will deliver more peak torque than the calculated maximum torque value and more continuous torque than the RMS calculated value. This torque margin accommodates mechanical wear, extra loads, lubricant hardening, and other unexpected factors. Consult the individual motor manufacturer for details on their torque margin and inertia matching.

Torque Equations - (servo or step motor)

Horizontal Applications

$$T_{\text{Total-Accel}} = T_{\text{Acc}} + T_{\text{Breakaway}} + T_{\text{Friction}} + T_{\text{Gravity}}$$

$$T_{\text{Total-Constant}} = T_{\text{Breakaway}} + T_{\text{Friction}} + T_{\text{Gravity}}$$

$$T_{\text{Total-Decel}} = T_{\text{Acc}} - T_{\text{Breakaway}} - T_{\text{Friction}} - T_{\text{Gravity}}$$

Vertical Applications

Upward Move

$$T_{\text{Total-Accel}} = T_{\text{Acc}} + T_{\text{Breakaway}} + T_{\text{Friction}} + T_{\text{Gravity}}$$

$$T_{\text{Total-Constant}} = T_{\text{Breakaway}} + T_{\text{Friction}} + T_{\text{Gravity}}$$

$$T_{\text{Total-Decel}} = T_{\text{Acc}} - T_{\text{Breakaway}} - T_{\text{Friction}} - T_{\text{Gravity}}$$

Vertical Applications

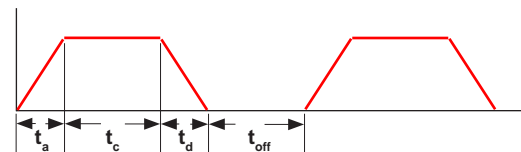
Downward Move

$$T_{\text{Total-Accel}} = T_{\text{Acc}} + T_{\text{Breakaway}} + T_{\text{Friction}} - T_{\text{Gravity}}$$

$$T_{\text{Total-Constant}} = T_{\text{Breakaway}} + T_{\text{Friction}} - T_{\text{Gravity}}$$

$$T_{\text{Total-Decel}} = T_{\text{Acc}} - T_{\text{Breakaway}} - T_{\text{Friction}} - T_{\text{Gravity}}$$

Servo motor RMS calculation



$$T_{\text{RMS}} = \sqrt{\frac{(T_a)^2 t_a + (T_c)^2 t_c + (T_d)^2 t_d + (T_{\text{off}})^2 t_{\text{off}}}{t_a + t_c + t_d + t_{\text{off}}}}$$

$$T_{\text{Total-Accel}} = T_a = \text{acceleration torque}$$

$$T_{\text{Total-Constant}} = T_c = \text{constant velocity torque}$$

$$T_{\text{Total-Decel}} = T_d = \text{deceleration torque}$$

$$T_{\text{off}} = \text{torque at standstill - usually a 0 value}$$

$$T_{\text{RMS}} = \text{RMS (contINUous) torque}$$

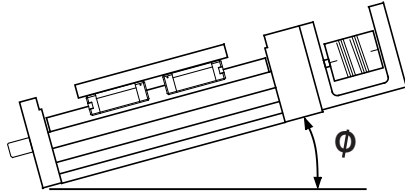
$$t_a = \text{acceleration time IN seconds}$$

$$t_c = \text{constant velocity time IN seconds}$$

$$t_d = \text{deceleration time IN seconds}$$

$$t_{\text{off}} = \text{dwell time IN seconds between moves}$$

Torque Equations - Screw Driven (Linear Motion)



$$T_{Total} = \left[T_{Acc} + T_{Breakaway} + T_{Friction} + T_{Gravity} \right] SF \quad (\text{oz-in})$$

$$T_{Acc} = \frac{1}{386} \left[\frac{J_{Load}}{e} + J_{Screw} + J_{Motor} \right] \frac{\omega}{t_a} \quad (\text{oz-in})$$

$$J_{Load} = \frac{d^2 (W_{Load} + W_{Other})}{(2\pi)^2} \frac{(16 \text{ oz})}{lb} \quad (\text{oz-in}^2)$$

$$J_{Screw} = \frac{\pi \rho L R^4}{2} \quad (\text{oz-in}^2)$$

$$J_{Motor} = \text{See Motor Data (not included in this catalog)} \quad (\text{oz-in}^2)$$

$$\omega = \frac{2\pi V_M}{d} \quad (\text{rad/sec})$$

$$T_{Breakaway} = \text{See values in individual screw technical sections} \quad (\text{oz-in})$$

$$T_{Friction} = \frac{d F_T \cos \phi}{2\pi e} \frac{(16 \text{ oz})}{lb} \quad (\text{oz-in})$$

$$F_T = \mu (W_{Load} + W_{Other}) \quad (\text{lbs})$$

$$T_{Gravity} = \frac{d (W_{Load} + W_{Other}) \sin \phi}{2\pi e} \frac{(16 \text{ oz})}{lb} \quad (\text{oz-in})$$

Notes:

1) T_{Total} is the maximum torque required from a motor during a move. This usually occurs during the acceleration portion of a move profile for horizontal applications and an upward move for vertical applications. During the deceleration portion of a move profile, $T_{Friction}$ and $T_{Breakaway}$ are subtractions from T_{Total} . For horizontal applications $T_{Gravity}$ has a zero value.

2) The factor 386 in the denominator for the T_{Acc} equation represents acceleration due to gravity (386 in/sec^2 or 32.2 ft/sec^2) and converts inertia from units of oz-in^2 to oz-in-sec^2 .

3) The safety factor (SF) should be between 1.4 to 1.6 for step motor systems and between 1.1 to 1.2 for servo motor systems.

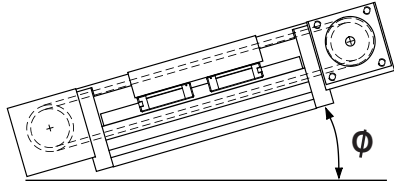
Thrust Force Equation

$$C_T = \frac{2\pi e (T_{Motor} - T_{Total})}{d} \frac{lb}{(16 \text{ oz})} \quad (\text{lbs})$$

Terms

C_T	= potential thrust force (lbs)
d	= lead of screw (in/rev)
e	= screw efficiency (90% = .9)
F_T	= total frictional force (lbs)
J_{Load}	= load inertia (oz-in^2)
J_{Screw}	= screw inertia (oz-in^2)
J_{Motor}	= motor inertia (oz-in^2)
L	= screw length (in)
ϕ	= angle of load from horizontal (degrees)
ρ	= density of steel screw (4.48 oz/in^3)
R	= radius of screw (in)
SF	= safety factor (see note #3)
t_a	= acceleration time (sec)
T_{Acc}	= required torque to accel the load (oz-in)
$T_{Breakaway}$	= breakaway torque (oz-in)
$T_{Friction}$	= required torque to overcome system friction (oz-in)
$T_{Gravity}$	= required torque to overcome gravity (oz-in)
T_{Motor}	= motor output torque at calculated speed (oz-in)
T_{Total}	= required torque to move the load (oz-in)
μ	= coefficient of friction for linear bearing system (.01)
V_M	= max linear velocity (in/sec)
ω	= angular velocity (rad/sec)
W_{Load}	= weight of load (lbs)
W_{Other}	= weight of carriage or weight of mounting hardware (lbs)
π	= 3.1416

Torque Equations - Belt Driven (Linear Motion)



$$T_{Total} = \left[T_{Acc} + T_{Breakaway} + T_{Friction} + T_{Gravity} \right] SF \quad (\text{oz-in})$$

$$T_{Acc} = \frac{1}{386} \left[\frac{J_{Load}}{e} + \frac{J_{Pulley}}{e} + \frac{J_{Belt}}{e} + J_{Motor} \right] \frac{\omega}{t_a} \quad (\text{oz-in})$$

$$J_{Load} = \frac{(W_{Load} + W_{Other}) r^2}{g^2} \frac{(16 \text{ oz})}{\text{lb}} \quad (\text{oz-in}^2)$$

$$J_{Pulley} = \frac{(W_{Pulley}) r^2}{2 g^2} \quad 2 \text{ (for 2 pulleys)} \quad (\text{oz-in}^2)$$

$$J_{Belt} = \frac{(W_{Belt}) r^2}{g^2} \quad (\text{oz-in}^2)$$

$$J_{Motor} = \text{See Motor Data (not included in this catalog)} \quad (\text{oz-in}^2)$$

$$\omega = \frac{V_M}{r} \quad (\text{rad/sec})$$

$$T_{Breakaway} = \frac{\text{See values in individual belt technical sections}}{g e} \quad (\text{oz-in})$$

$$T_{Friction} = \frac{(W_{Load} + W_{Other}) r \mu \text{Cos } \phi}{g e} \frac{(16 \text{ oz})}{\text{lb}} \quad (\text{oz-in})$$

$$T_{Gravity} = \frac{(W_{Load} + W_{Other}) r \text{Sin } \phi}{g e} \frac{(16 \text{ oz})}{\text{lb}} \quad (\text{oz-in})$$

Notes:

1) T_{Total} is the maximum torque required from a motor during a move. This usually occurs during the acceleration portion of a move profile for horizontal applications and an upward move for vertical applications. During the deceleration portion of a move profile, $T_{Friction}$ and $T_{Breakaway}$ are subtractions from T_{Total} . For horizontal applications $T_{Gravity}$ has a zero value.

2) The factor 386 in the denominator for the T_{Acc} equation represents acceleration due to gravity (386 in/sec² or 32.2 ft/sec²) and converts inertia from units of oz-in² to oz-in-sec².

3) The safety factor (SF) should be between 1.4 to 1.6 for step motor systems and between 1.1 to 1.2 for servo motor systems.

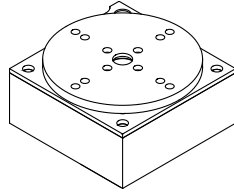
Terms

C_T	= potential thrust force (lbs)
e	= gearhead efficiency (90% = .9)
g	= gearhead ratio (5:1 = 5)
J_{Belt}	= belt inertia (oz-in ²)
J_{Load}	= load inertia (oz-in ²)
J_{Motor}	= motor inertia (oz-in ²)
J_{Pulley}	= pulley inertia (oz-in ²)
ϕ	= angle of load from horizontal (degrees)
r	= radius of drive pulley (in)
SF	= safety factor (see note #3)
t_a	= acceleration time (sec)
T_{Acc}	= required torque to accel the load (oz-in)
$T_{Breakaway}$	= breakaway torque (oz-in)
$T_{Friction}$	= required torque to overcome system friction (oz-in)
$T_{Gravity}$	= required torque to overcome gravity (oz-in)
T_{Motor}	= motor output torque at calculated speed (oz-in)
T_{Total}	= required torque to move the load (oz-in)
μ	= coefficient of friction for linear bearing system (.01)
V_M	= max linear velocity (in/sec)
ω	= angular velocity (rad/sec)
W_{Belt}	= weight of belt (oz)
W_{Load}	= weight of load (lbs)
W_{Other}	= weight of carriage or weight of mounting hardware (lbs)
W_{Pulley}	= weight of pulley (oz)

Thrust Force Equation

$$C_T = \frac{(T_{Motor} - T_{Total}) g e}{r} \frac{\text{lb}}{(16 \text{ oz})} \quad (\text{lbs})$$

Torque Equations - Worm Gear Driven (Rotary Motion)



$$T_{\text{Total}} = \left[T_{\text{Acc}} + T_{\text{Breakaway}} \right] \text{SF} \quad (\text{oz-in})$$

$$T_{\text{Acc}} = \frac{1}{386} \left[\frac{J_{\text{Load}}}{e} + J_{\text{Worm}} + J_{\text{Motor}} \right] \frac{\omega}{t_a} \quad (\text{oz-in})$$

$$J_{\text{Load}} = \frac{(W_{\text{Load}} + W_{\text{Table Top}}) R^2}{2 N^2} \left(\frac{16 \text{ oz}}{\text{lb}} \right) \quad (\text{oz-in}^2)$$

$$J_{\text{Worm}} = \text{See values in individual rotary table technical sections} \quad (\text{oz-in}^2)$$

$$J_{\text{Motor}} = \text{See Motor Data (not included in this catalog)} \quad (\text{oz-in}^2)$$

$$\omega = 2 \pi N V_M \quad (\text{rad/sec})$$

$$T_{\text{Breakaway}} = \text{See values in individual rotary table technical sections} \quad (\text{oz-in})$$

Notes:

1) T_{Total} is the maximum torque required from a motor during a move. This usually occurs during the acceleration portion of a move profile for horizontal applications and an upward move for vertical applications. During the deceleration portion of a move profile, T_{Friction} and $T_{\text{Breakaway}}$ are subtractions from T_{Total} . For horizontal applications T_{Gravity} has a zero value.

2) The factor 386 in the denominator for the T_{Acc} equation represents acceleration due to gravity (386 in/sec² or 32.2 ft/sec²) and converts inertia from units of oz-in² to oz-in-sec².

3) The safety factor (SF) should be between 1.4 to 1.6 for step motor systems and between 1.1 to 1.2 for servo motor systems.

4) The frictional torque value is so small, it can be ignored for rotary table torque equations.

Terms

e	= worm gear assembly efficiency (90% = .9)
J_{Load}	= load inertia (oz-in ²)
J_{Motor}	= motor inertia (oz-in ²)
J_{Worm}	= worm gear assembly inertia (oz-in ²)
N	= worm gear reduction (45:1 = 45)
R	= radius of table top (in)
SF	= safety factor (see note #3)
t_a	= acceleration time (sec)
T_{Acc}	= required torque to accel the load (oz-in)
T_{Breakaway}	= breakaway torque (oz-in)
T_{Total}	= required torque to move the load (oz-in)
V_M	= max table top velocity (revs/sec)
ω	= angular velocity (rad/sec)
W_{Load}	= weight of load (lbs)
W_{Table Top}	= weight of table top or weight of mounting hardware (lbs)
π	= 3.1416

Abbe Error: The linear positioning error caused by the angular errors of the linear bearings, and the offset between the precision determining element (screw or feedback device), and the actual point of interest.

Acceleration: The positive rate of change in velocity from a lower to a higher speed as a function of time. ($1g = 386 \text{ in/sec}^2 = 9.81 \text{ m/sec}^2$).

Accuracy: Maximum deviation between desired & actual position when a positioning system performs a move. See page A-30.

Acme Screw: Device that converts rotary to linear motion by using a solid material that slides on a screw shaft thread surface (similar to a nut & bolt). High friction, low efficiency, smooth motion drive mechanism. See page A-13.

AGMA Class 10: American Gear Manufacturers Association classification of the gears used in a worm gear assembly.

Angular Contact Bearings: Rotary bearing used to support the table top in a rotary positioning table and also used as a screw end support.

Anodize: Black or clear protective coating created on aluminum.

Axial Load: The load generated in the direction of travel that a drive mechanism experiences. See page A-23.

Back-driving: The ability of a drive mechanism to move when an external force is exerted upon it.

Backlash: The movement of the drive mechanism before carriage (or table top) movement. Caused by the clearance of the drive mechanism components.

Ball & Rod Bearing: Load carrying element which utilizes non-recirculating steel balls rolling between four steel rods (two mounted to the carriage and two mounted to the base). See page A-10.

Ball Screw: Device that converts rotary to linear motion by using recirculating balls in a nut that roll on a screw shaft thread surface. Low friction and high efficiency provide for a high speed, long life and high duty cycle assembly. See drive page A-13.

Base: Precision machined aluminum (or steel) structure used to support the linear bearing system and the drive mechanism of a positioning table.

Bearing Dynamic Capacity: The maximum load (lbs or kg) applied to a bearing which will yield the rated travel life of 2 million inches (50 km). See page A-17.

Bearing Static Capacity: The maximum load (lbs or kg) applied to a bearing in a non-moving state. See page A-17.

Belt Tensile Force: The maximum applied force, from either an attached motor's acceleration rate, or through the belt tension which will permanently deform the belt.

Bidirectional Repeatability: How accurate (from either direction) a positioning system can return to a known previously traveled location. See page A-33.

Breakaway Torque: The torque required to start table motion. Consists of linear bearing & drive mechanism preload force, seal drag and the component of static friction (stiction).

Carriage: Aluminum or steel precision machined plate that carries the user mounted load. The linear bearings and screw nut adapter bracket (or belt ends) are mounted to this plate.

Closed Loop: Broadly applied term relating to any system where the output of a device is measured and compared to the input. The output is then adjusted to reach the desired condition.

Coefficient of Friction: The ratio of the force required to move an attached load versus the load itself. For linear bearing systems with rolling balls typically between (0.0001 to 0.01).

Compression Loading: The load acting on the drive screw assembly which would tend to compress or buckle the screw. Can occur in vertical and long length horizontal screw applications.

Concentricity: The radial runout (deviation) between a perfect circle and the path the table top takes throughout one full rotation of the table top. See page A-32

Cover Plate: Cover which protects the linear rails & drive mechanism of a linear positioning table.

Critical Speed: Maximum rotational speed of an acme or ball screw shaft prior to creating excessive resonant vibrations. Determined by screw length, diameter and end support configuration.

Cross Roller Bearing: Load carrying element which utilizes non-recirculating cylindrical rollers rotating between two "V" ways (one mounted to the carriage and one mounted to the base). See page A-10.

Deceleration: The negative rate of change in velocity from a higher to a lower speed as a function of time. ($1g = 386 \text{ in/sec}^2 = 9.81 \text{ m/sec}^2$).

Deflection: Amount of displacement (inches or mm) that a positioning table experiences caused by an applied load. See page A-27.

Diameter: Outer dimension of a drive screw shaft, pulley for a belt drive mechanism, or table top for a rotary table.

Drive Mechanism: Assembly consisting of components used to physically move a positioning system carriage or table top. See page A-13.

Drunkness: Relates to the drive screw's per revolution geometric variations. Derived from manufacturing tolerances of the screw thread with deviations that are concentric and perpendicular to the screw.

Duty Cycle: Percentage of time between a positioning systems dynamic (moving) state and the total move cycle time (move time + stationary time).

Dynamic Braking: Technique within a motor control unit that stops a motor.

Dynamic Horizontal Load Capacity: The maximum load (lbs or kg) centered on a positioning table's carriage (or table top), which will yield the rated travel life with the table mounted in a horizontal plane.

Dynamic Moment Load Capacity: The maximum load (ft-lbs or N-m) acting upon a carriage or table top which will yield the rated travel life.

Dynamic Pitch, Roll & Yaw Moment Load Capacity: The maximum pitch, roll or yaw load (ft-lbs or N-m) acting upon a linear positioning table carriage which will yield the rated travel life.

Efficiency: Percentage of input torque which is transmitted through the mechanical drive assembly (screw, worm gear, or gearhead).

Encoder: Rotary or linear electrical pulse generating device which is used to provide feedback to a motion controller or digital display.

End Plates: That part of a linear positioning table which supports either screw end support bearings or belt pulleys.

EOT (End of Travel Switch): Electrical switch which signals to a motion controller that the carriage of a linear positioning table has reached the end of its travel. Used to prevent carriage from contacting end plates. See page A-38.

Feedback: Signal that is transferred from the output back to the input for use in a closed loop system.

Fixed-Simple: Method of supporting screw shaft ends within a linear positioning table. Removes end play within a screw assembly.

Flatness: Maximum vertical deviation of carriage travel from a straight line. See page A-30.

Friction: The resistance to motion caused by surfaces rubbing together within bearings and drive mechanisms.

Gearhead: Gear reducing device which mounts to the input of a belt (or screw) driven positioning table. This device increases the output torque from the motor by the ratio amount, while reducing the reflected load inertia to the motor by the inverse of the ratio squared (e.g. 5:1 ratio increases torque five times and reduces reflected inertia by 25 times).

Hall Effect Switch: Non-contact sensor mounted to a table base which detects a magnet located on the carriage (or table top). Used for EOT and/or home sensing.

Hand Crank: Device that is mounted to a screw shaft extension (or drive shaft) of a linear positioning system which allows for manual table positioning.

Hard Stop: The physical end of travel (end plates) for a linear positioning table. EOT switches should be used to prevent hard stop collisions.

Home Switch: Electrical switch which signals to a motion controller that the carriage (or table top) has reached a known reference location on a positioning table. See page A-38.

Impact Load: Forceful load striking (colliding) a positioning system carriage, structure or table top.

Inertia: The measure of an object's resistance to a change in velocity. The larger an object's inertia (mass & shape), the greater the force or torque required to move it.

Inertia Match: Ratio of the drive mechanism, load, and coupling inertias that are reflected back to the output shaft of a motor.

Lead: The linear distance traveled by a drive mechanism (screw or belt) during one complete revolution of the drive mechanism.

Leadscrew: Another name for an acme screw. See acme screw. See page A-13.

Load: Dynamic & static forces (due to weight or motion) that positioning table components are subjected to.

Lubrication: Process of applying grease or oil between two solid surfaces with the intent of reducing friction, heat, and wear by creating a thin film between the surfaces.

Maximum Acceleration: The maximum acceleration a positioning system can experience before causing damage or failure of table components. See page A-29.

Maximum Speed: The maximum speed a positioning system can experience before causing damage or failure of table components. See page A-28.

Modulus of Elasticity: The ratio of unit stress to unit strain within the proportional limit of a material in shear.

Moment of Inertia: The measure of the strength of an object to resist deflecting ("I" value). See page A-27.

Motion Controller: The intelligent device that instructs (controls) the movement of a motor which is attached to a positioning table.

Motor Coupling: Device which connects the shaft of a motor to the drive mechanism shaft of a positioning table. See page A-37.

Motor Wrap: The process of locating a motor parallel to the positioning table via a belt & pulley assembly. Used for screw drive positioning tables.

NEMA: National Electrical Manufacturers Association which sets standards for motor dimensions.

NEMA Motor Mount: Bracket which has a predefined dimension and bolt hole locations for mounting of either a NEMA 23, 34 or 42 size motor.

Non-Preloaded Nut: A nut which has axial clearance (backlash) between the nut and screw threads.

Non-Recirculating Bearings: Bearings that have balls/rollers which roll in an assembly. The balls/rollers do not recirculate in & out of load points.

Normally Closed (NC) Switch: Sensor output signal is normally always active until tripped.

Normally Open (NO) Switch: Sensor output signal is normally always inactive until tripped.

NPN Switch: Current sinking electrical output which supplies a path to ground

Open Loop: Broadly applied term relating to any system where the output of a device is not sensed, therefore no corrective action can be taken for unwanted errors.

Orthogonality: The degree of perpendicularity (squareness) between two axes.

Pitch: The distance from the center of one thread to the center of the next thread. The relationship between pitch and lead differ depending on the number of screw thread "starts". Pitch is often referred to as the inverse of lead, however this is not true for screws with multi-start nuts.

PNP Switch: Current sourcing electrical output which supplies a path to a positive voltage.

Position Accuracy: Maximum deviation between desired & actual position when a positioning system performs a move. See page A-30.

Power-Off Brake: Device which is used to hold a linear positioning table drive mechanism securely in place. See page A-40.

Preloaded Nut: A nut assembly in which there is no axial clearance (backlash) between the nut and screw threads.

Radial Bearings: Rotary bearing used to support the table top in a rotary positioning table and also used as a screw end support.

Recirculating Bearings: Bearings that have balls/rollers which recirculate in & out of load points within its assembly.

Repeatability: How accurate a positioning system can (over successive attempts) return to a known previously traveled location. See page A-33.

Resolution: Smallest detectable incremental of measurement for a system. Influenced by drive mechanism (mechanical resolution), motor resolution (electrical resolution), and encoder feedback (closed-loop resolution). See page A-15.

Runout: Maximum vertical deviation above or below a horizontal plane that is perpendicular to the axis of motion the table top rotates in. See page A-32.

Safety Factor: Number used to help calculate dynamic & static forces acting upon a positioning system based on application parameters

Squareness: The degree of perpendicularity (Orthogonality) between two axes.

Stackup Errors: In multi-axis positioning systems, the angular errors transmitted from the bottom axes to the top axes.

Static Horizontal Load Capacity: The maximum load (lbs or kg) centered on a positioning table's carriage (or table top), with the table in a non-moving (rest) state.

Static Moment Load Capacity: The maximum load (ft-lbs or N-m) acting upon a carriage, or table top with the table in a non-moving (rest) state.

Static Pitch, Roll & Yaw Moment: The maximum pitch, roll or yaw load (ft-lbs or N-m) acting upon a linear positioning table carriage with the table in a non-moving (rest) state.

Stiction: The static friction usually present in linear bearing & drive mechanism assemblies that can cause a positioning system to stick (cog) at low speeds.

Tension Loading: The load acting on the drive screw assembly which would tend to stretch the screw. For vertical applications, it is better to configure a screw driven positioning table to be in tension and not compression. This is accomplished by mounting the motor mount end up, above the table.

Thrust Force: The axial load (force) generated in the direction of travel by a drive mechanism and attached motor of a positioning system. See page A-23.

Torque: The rotary equivalent to force. Equal to the product of the force perpendicular to the radius of motion and distance from center of rotation to the point where the force is applied.

Torque, Acceleration: The torque required to change the speed of a positioning table.

Torque, Breakaway: See Breakaway Torque on page A-50.

Torque, Continuous: The torque required to move a positioning table at a constant travel rate.

Torque, Gravity: The torque required to move a positioning table to overcome gravity. Occurs in applications where the table is not horizontal.

Travel Length: Usable travel of the carriage for a given positioning table series within this catalog. Ratings are from hard stop to hard stop. Travel reductions can occur when selecting various screw options.

Unidirectional Repeatability: How accurate a positioning system can return to a known previously traveled location by approaching from the same direction. See page A-33.

Wind-up: Lost motion (angular deflection) due to compliances within a drive assembly or motor coupling as a torque is applied to a positioning table.

Wobble: The angular variation (axis runout) from the true centerline of rotation throughout one full rotation of a rotary positioning table top. See page A-32.

Worm Gear: Drive assembly which uses a pair of matched gears. The cylindrical worm (similar in looks to an acme screw) physically meshes with the teeth on the worm wheel to create rotary motion.

Notes

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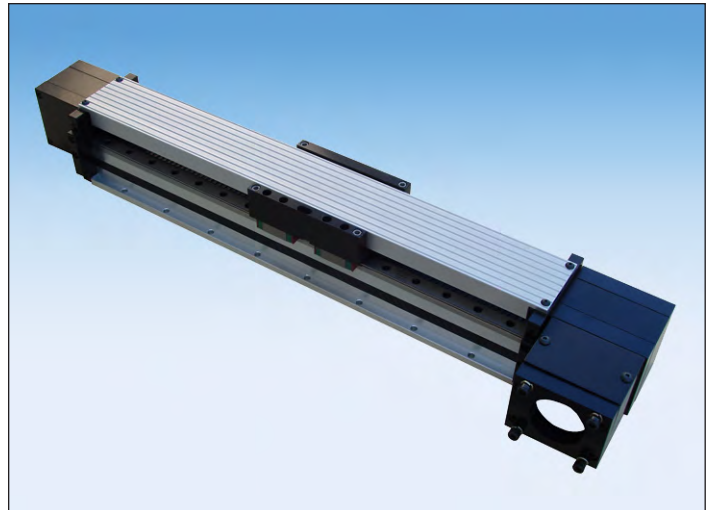
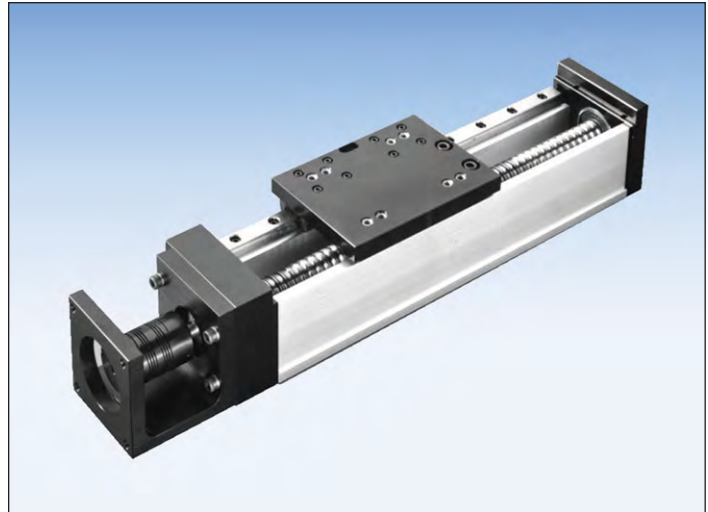
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130 & 140 Series Positioning Tables

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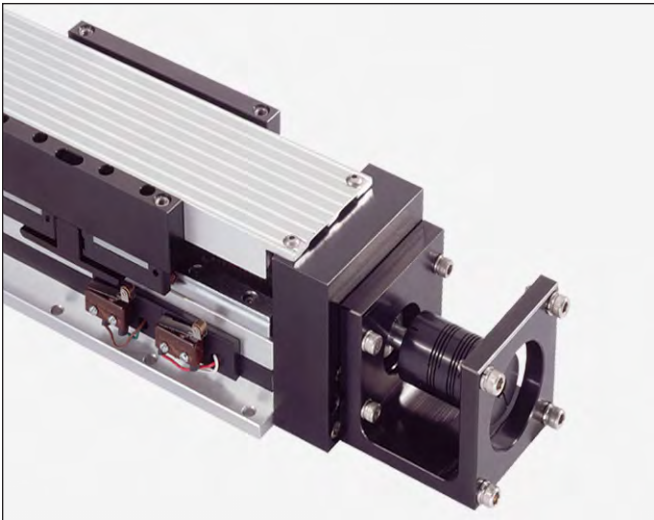
Single or Multiple Axis

LINTECH's 130 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 130 series tables are designed to maximize performance while minimizing physical size and cost. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on a single precision ground linear rail. The single linear rail is mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 30 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 130 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Cover Plates

For operator protection, these tables can be fitted with aluminum cover plates. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 130 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 130 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

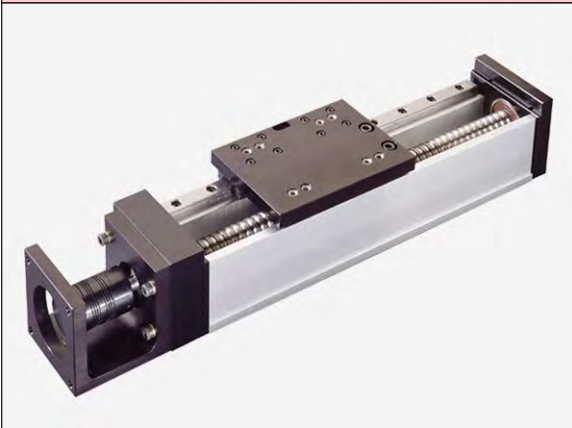
Other

The 130 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

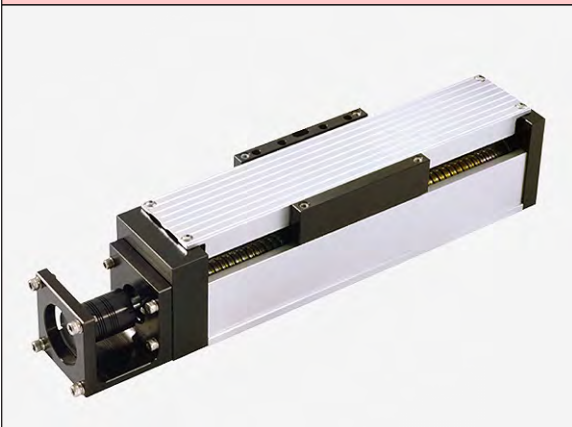
Standard Features - 130 Series

- ❑ Compact 2.875 inches (73 mm) wide by 2.375 inches (60 mm) tall
- ❑ Travel lengths from 2 inches (50 mm) to 60 inches (1520 mm)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ 0° F to +185° F (-18° C to +85° C) operating temperature
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design
- ❑ 1 rail, 1 or 2 bearing carriages

130-CP0 Series



130-CP1 Series



130-CP2 Series



Options - 130 Series

- ❑ Chrome plated linear bearings, rails and screws
- ❑ AUTOCAD® drawings available via the internet
- ❑ End of travel (EOT) and home switches wired
- ❑ Adapter brackets for non-NEMA motors
- ❑ Linear and rotary incremental encoders
- ❑ NEMA 23 & 34 motor wrap packages
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Carriage adapter plates
- ❑ Vertical angle brackets
- ❑ Turcite nut options
- ❑ Motor couplings
- ❑ Cover plates
- ❑ Hand crank

- ❑ Ball screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- * 0.500 inch diameter, 0.500 inch lead
- 0.625 inch diameter, 1.000 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- * 16 mm diameter, 10 mm lead
- * 16 mm diameter, 16 mm lead

Ground - Preloaded Nuts Only:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 16 mm lead

* (Reduction of travel with preloaded nut)

- ❑ Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.100 inch lead
- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 4 mm lead

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13 **2** **4** **02** - **CP0** - **1** - **S114** - **M02** - **C145** - **L01** - **E00** - **B00**

Table Series

Number of Bearings

- 1** - 1 bearing per carriage
- 2** - 2 bearings per carriage

Carriage Length

- 4** - 4 inches

Travel Length (see pages B-6, B-8 & B-10)

- 02** - 2 to 60 inches

Cover Plate

- CP0** - no cover plates
- CP1** - top cover plate only
- CP2** - top & side cover plates

Carriage Inserts (see pages B-7, B-9 & B-11)

- 1** - English mount
- 2** - Metric mount

Screw Options (see pages B-14 to B-19)

<i>Rolled ball screws</i>	<i>Precision ball screws</i>	<i>Ground ball screws</i>
S001 - .500 x .500 NPL	S114 - .625 x .200 NPL	S212 - .625 x .200 PL
S002 - .500 x .500 PL	S115 - .625 x .200 PL	S213 - .625 x .500 PL
S003 - .500 x .500 NPL(T)	S116 - 16 x 5 NPL	S214 - 16 x 5 PL
S004 - .500 x .500 PL(T)	S117 - 16 x 5 PL	S215 - 16 x 16 PL
S005 - .625 x .200 NPL	S118 - 16 x 10 NPL	
S006 - .625 x .200 PL	S119 - 16 x 10 PL	<i>Rolled acme screws</i>
S007 - .625 x .200 NPL(T)	S120 - 16 x 16 NPL	S300 - .625 x .100 NPL
S008 - .625 x .200 PL(T)	S121 - 16 x 16 PL	S301 - .625 x .100 PL
S009 - .625 x 1.000 NPL		S302 - .625 x .200 NPL
S010 - .625 x 1.000 PL		S303 - .625 x .200 PL
S011 - .625 x 1.000 NPL(T)		S304 - 16 x 4 NPL
S012 - .625 x 1.000 PL(T)	S999 - other	S305 - 16 x 4 PL

Motor Mount (see pages B-7, B-9, B-11, B-42 & B-43)

- M00** - none
- M01** - hand crank
- M99** - other
- M02** - NEMA 23 mount (E)
- M03** - NEMA 23 mount (M)
- M04** - NEMA 34 mount (E)
- M05** - NEMA 34 mount (M)
- M06** - NEMA 23 (RH) wrap
- M07** - NEMA 23 (LH) wrap
- M08** - NEMA 34 (RH) wrap
- M09** - NEMA 34 (LH) wrap

Coupling Options (see pages B-38 to B-39)

- C000** - none
- C999** - other
- C020 to C024** - C100
- C040 to C047** - C125
- C125 to C129** - H100
- C145 to C154** - H131
- C400 to C406** - G100
- C425 to C434** - G126

Limit & Home Switches (see pages B-35 to B-37)

L00 - no switches		Mechanical	Reed	Hall	Prox (NPN)	Prox (PNP)
L99 - other	EOT & home switches	L01	L04	L07	L10	L13
	EOT switches only	L02	L05	L08	L11	L14
	home switch only	L03	L06	L09	L12	L15

Encoder Options (see page B-45)

- E00** - none
- E01** - rotary (500 lines/rev)
- E02** - rotary (1000 lines/rev)
- E03** - rotary (1270 lines/rev)
- E10** - linear (2500 lines/inch)
- E11** - linear (125 lines/mm)
- E99** - other

Power-off Brakes (see page B-44)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other

(E) - English Interface (NPL) - Non Preloaded
 (LH) - Left Hand (PL) - Preloaded
 (M) - Metric Interface (RH) - Right Hand
 (T) - Turcite Nut

Specifications

Load Capacities		One (1) Bearing Carriage	Two (2) Bearing Carriage
Dynamic Horizontal	2 million inches (50 km) of travel	100 lbs (45 kg)	200 lbs (90 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	34 lbs (15 kg)	68 lbs (30 kg)
Static Horizontal		200 lbs (90 kg)	400 lbs (180 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	8 ft-lbs (11 N-m)	16 ft-lbs (22 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	3 ft-lbs (4 N-m)	5 ft-lbs (7 N-m)
Static Roll Moment		14 ft-lbs (19 N-m)	28 ft-lbs (38 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	4 ft-lbs (5,4 N-m)	15 ft-lbs (20 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	1 ft-lbs (1,9 N-m)	5 ft-lbs (7 N-m)
Static Pitch & Yaw Moment		8 ft-lbs (10 N-m)	30 ft-lbs (40 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	100 lbs (45 kg)	100 lbs (45 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	34 lbs (15 kg)	34 lbs (15 kg)
Each Bearing Static Load Capacity		200 lbs (90 kg)	200 lbs (90 kg)
Thrust Force Capacity	10 million screw revolutions	665 lbs (302 kg)	665 lbs (302 kg)
Thrust Force Capacity	500 million screw revolutions	180 lbs (82 kg)	180 lbs (82 kg)
Maximum Acceleration		50 in/sec ² (1,3 m/sec ²)	150 in/sec ² (3,8 m/sec ²)
d₂	Center to center distance (spacing) of each bearing on a single rail	-	2.088 in (53,0 mm)
d_r	CP0 version Center distance of the bearing to top of carriage plate surface	0.750 in (19,1 mm)	0.750 in (19,1 mm)
d_r	CP1 version Center distance of the bearing to top of carriage plate surface	1.375 in (34,9 mm)	1.375 in (34,9 mm)

Other	For One (1) & Two (2) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Stainless Steel
Screw Material (see pages B-14 to B-19)	Acme Screw - Stainless Steel
Screw Material (see pages B-14 to B-19)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00013 in/in (< 3,30 microns/25mm)
Flatness	< 0.00013 in/in (< 3,30 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
13x402-CP0	2 (50)	6.0 (152,4)	9.875 (250,8)	0.188 (4,8)	3	8	9.25 (235)	4.8 (2,2)
13x404-CP0	4 (100)	8.0 (203,2)	11.875 (301,6)	1.188 (30,2)	3	8	11.25 (286)	5.3 (2,4)
13x406-CP0	6 (150)	10.0 (254,0)	13.875 (352,4)	0.313 (8,0)	5	12	13.25 (337)	5.8 (2,6)
13x408-CP0	8 (200)	12.0 (304,8)	15.875 (403,2)	1.313 (33,4)	5	12	15.25 (387)	6.3 (2,9)
13x412-CP0	12 (300)	16.0 (406,4)	19.875 (504,8)	1.438 (36,5)	7	16	19.25 (489)	7.3 (3,3)
13x416-CP0	16 (405)	20.0 (508,0)	23.875 (606,4)	1.563 (39,7)	9	20	23.25 (591)	8.3 (3,8)
13x420-CP0	20 (505)	24.0 (609,6)	27.875 (708,0)	1.688 (42,9)	11	24	27.25 (692)	9.3 (4,2)
13x424-CP0	24 (605)	28.0 (711,2)	31.875 (809,6)	1.813 (46,1)	13	28	31.25 (794)	10.3 (4,7)
13x430-CP0	30 (760)	34.0 (863,6)	37.875 (962,0)	1.063 (27,0)	17	36	37.25 (946)	11.8 (5,4)
13x436-CP0	36 (910)	40.0 (1016,0)	43.875 (1114,4)	0.313 (8,0)	21	44	43.25 (1099)	13.3 (6,0)
13x442-CP0	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.438 (36,5)	23	48	49.25 (1251)	14.8 (6,7)
13x448-CP0	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	0.688 (17,5)	27	56	55.25 (1403)	16.3 (7,4)
13x454-CP0	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	1.813 (46,1)	29	60	61.25 (1556)	17.8 (8,1)
13x460-CP0	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	1.063 (27,0)	33	68	67.25 (1708)	19.3 (8,8)

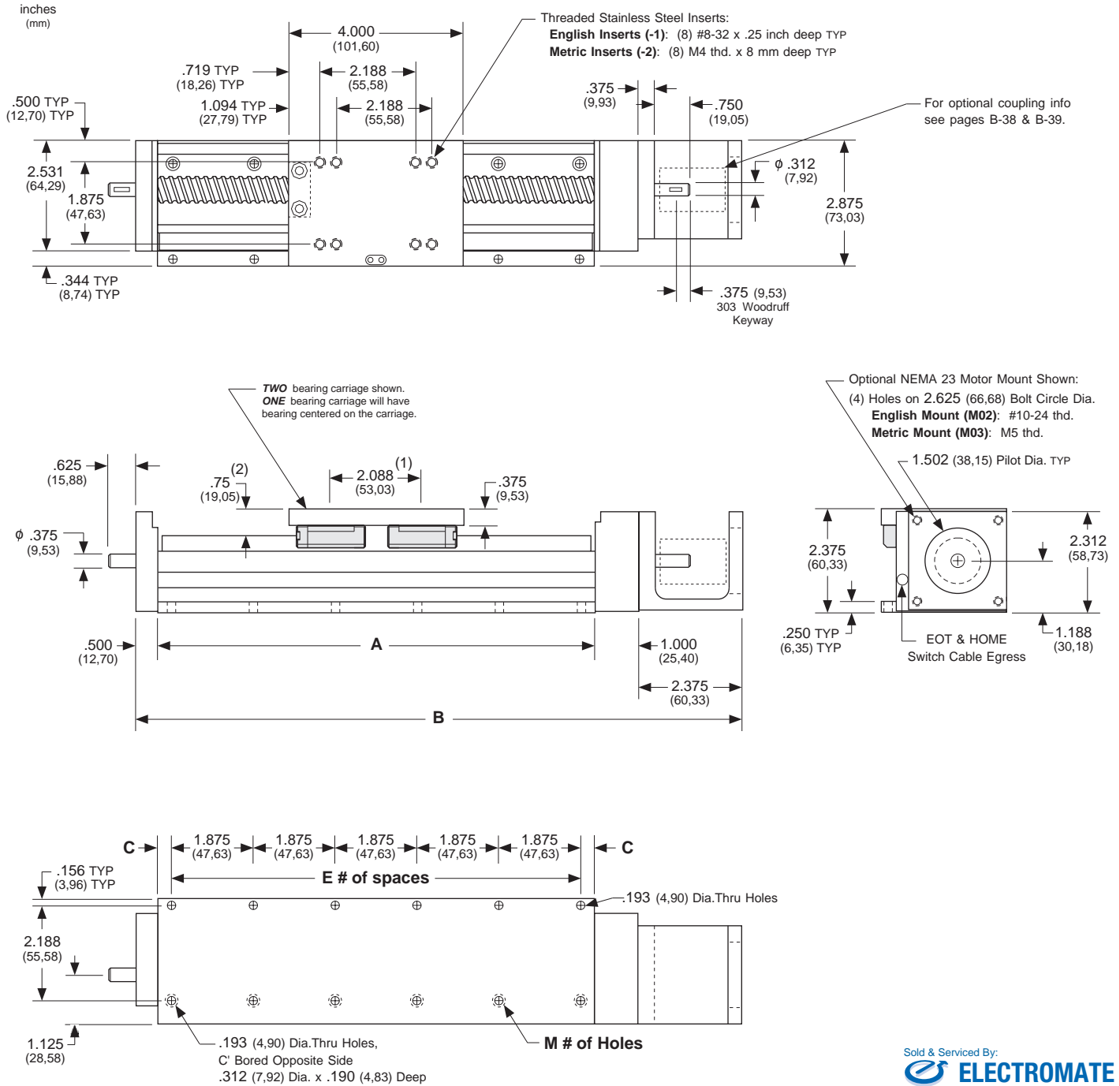
- x = 1; Carriage has 1 bearing; Carriage weight = 1.1 lbs. (0,50 kg)
- x = 2; Carriage has 2 bearings; Carriage weight = 1.2 lbs. (0,55 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 1 bearing carriage [1.1 lbs (0,55 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 2 bearing carriage add 0.1 lbs (0,05 kg) to each value.

Dimensions

- Without Cover Plates -



- (1) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (2) This value is center distance of the bearing to top of carriage plate surface (d_1).

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Note: Any 130 series table can be mounted on top of a second 130 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
13x402-CP1	2 (50)	6.0 (152,4)	9.875 (250,8)	0.188 (4,8)	3	8	9.25 (235)	5.5 (2,5)
13x404-CP1	4 (100)	8.0 (203,2)	11.875 (301,6)	1.188 (30,2)	3	8	11.25 (286)	6.2 (2,8)
13x406-CP1	6 (150)	10.0 (254,0)	13.875 (352,4)	0.313 (8,0)	5	12	13.25 (337)	6.8 (3,1)
13x408-CP1	8 (200)	12.0 (304,8)	15.875 (403,2)	1.313 (33,4)	5	12	15.25 (387)	7.4 (3,4)
13x412-CP1	12 (300)	16.0 (406,4)	19.875 (504,8)	1.438 (36,5)	7	16	19.25 (489)	8.8 (4,0)
13x416-CP1	16 (405)	20.0 (508,0)	23.875 (606,4)	1.563 (39,7)	9	20	23.25 (591)	10.0 (4,5)
13x420-CP1	20 (505)	24.0 (609,6)	27.875 (708,0)	1.688 (42,9)	11	24	27.25 (692)	11.3 (5,1)
13x424-CP1	24 (605)	28.0 (711,2)	31.875 (809,6)	1.813 (46,1)	13	28	31.25 (794)	12.6 (5,7)
13x430-CP1	30 (760)	34.0 (863,6)	37.875 (962,0)	1.063 (27,0)	17	36	37.25 (946)	14.6 (6,6)
13x436-CP1	36 (910)	40.0 (1016,0)	43.875 (1114,4)	0.313 (8,0)	21	44	43.25 (1099)	16.5 (7,5)
13x442-CP1	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.438 (36,5)	23	48	49.25 (1251)	18.4 (8,4)
13x448-CP1	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	0.688 (17,5)	27	56	55.25 (1403)	20.4 (9,3)
13x454-CP1	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	1.813 (46,1)	29	60	61.25 (1556)	22.3 (10,1)
13x460-CP1	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	1.063 (27,0)	33	68	67.25 (1708)	24.3 (11,0)

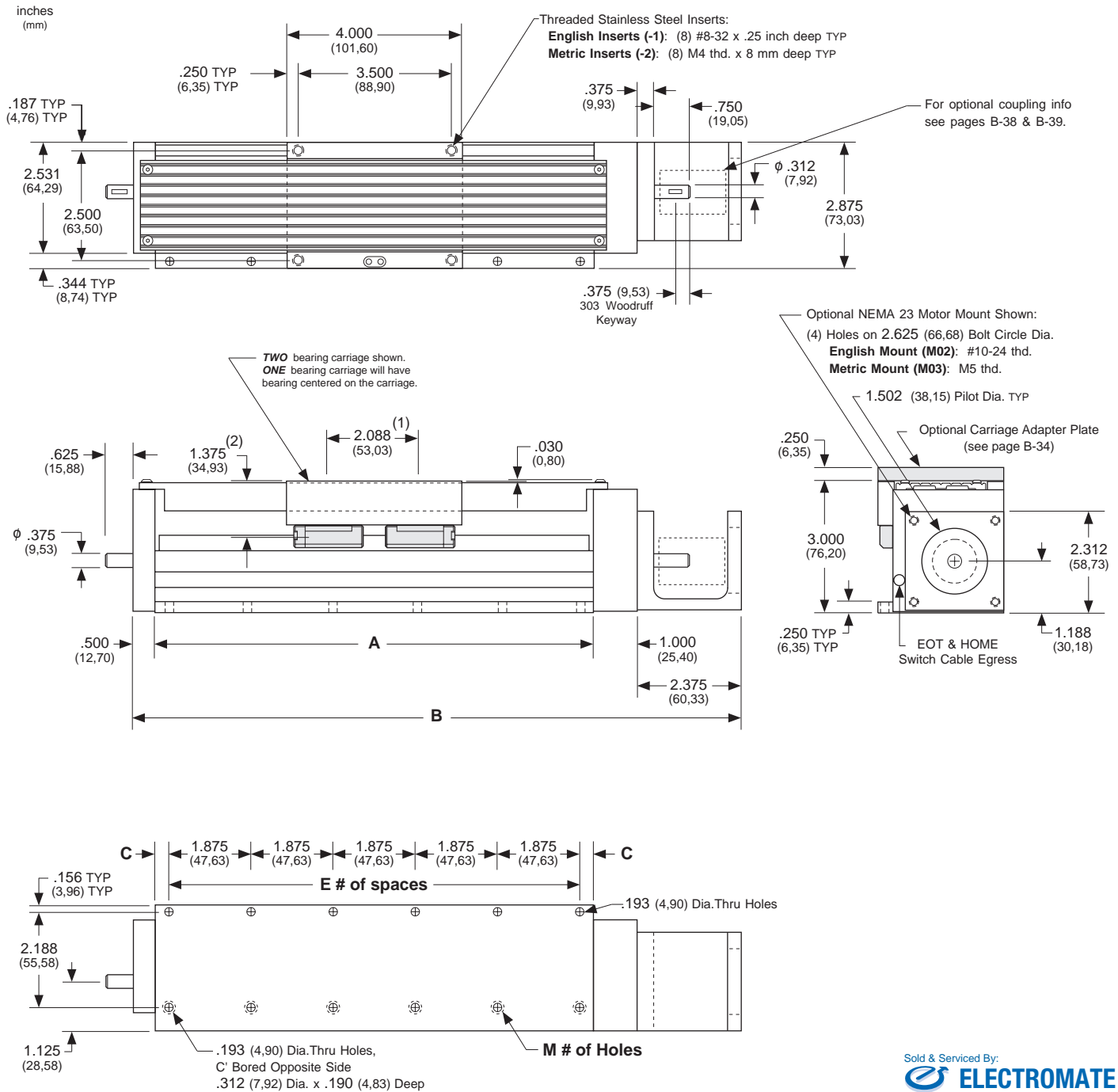
- x = 1; Carriage has 1 bearing; Carriage weight = 1.4 lbs. (0,64 kg)
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 1 bearing carriage [1.1 lbs (0,55 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 2 bearing carriage add 0.1 lbs (0,05 kg) to each value.

Dimensions

- With Top Cover Plate Only -



- (1) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (2) This value is center distance of the bearing to top of carriage plate surface (d_1).

Note: Any 130 series table can be mounted on top of a second 130 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

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Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
13x402-CP2	2 (50)	6.0 (152,4)	9.875 (250,8)	0.188 (4,8)	3	8	9.25 (235)	5.7 (2,58)
13x404-CP2	4 (100)	8.0 (203,2)	11.875 (301,6)	1.188 (30,2)	3	8	11.25 (286)	6.4 (2,90)
13x406-CP2	6 (150)	10.0 (254,0)	13.875 (352,4)	0.313 (8,0)	5	12	13.25 (337)	7.0 (3,17)
13x408-CP2	8 (200)	12.0 (304,8)	15.875 (403,2)	1.313 (33,4)	5	12	15.25 (387)	7.6 (3,45)
13x412-CP2	12 (300)	16.0 (406,4)	19.875 (504,8)	1.438 (36,5)	7	16	19.25 (489)	9.1 (4,13)
13x416-CP2	16 (405)	20.0 (508,0)	23.875 (606,4)	1.563 (39,7)	9	20	23.25 (591)	10.4 (4,72)
13x420-CP2	20 (505)	24.0 (609,6)	27.875 (708,0)	1.688 (42,9)	11	24	27.25 (692)	11.7 (5,31)
13x424-CP2	24 (605)	28.0 (711,2)	31.875 (809,6)	1.813 (46,1)	13	28	31.25 (794)	13.1 (5,94)
13x430-CP2	30 (760)	34.0 (863,6)	37.875 (962,0)	1.063 (27,0)	17	36	37.25 (946)	15.1 (6,85)
13x436-CP2	36 (910)	40.0 (1016,0)	43.875 (1114,4)	0.313 (8,0)	21	44	43.25 (1099)	17.1 (7,76)
13x442-CP2	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.438 (36,5)	23	48	49.25 (1251)	19.1 (8,66)
13x448-CP2	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	0.688 (17,5)	27	56	55.25 (1403)	21.2 (9,62)
13x454-CP2	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	1.813 (46,1)	29	60	61.25 (1556)	23.2 (10,52)
13x460-CP2	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	1.063 (27,0)	33	68	67.25 (1708)	25.3 (11,47)

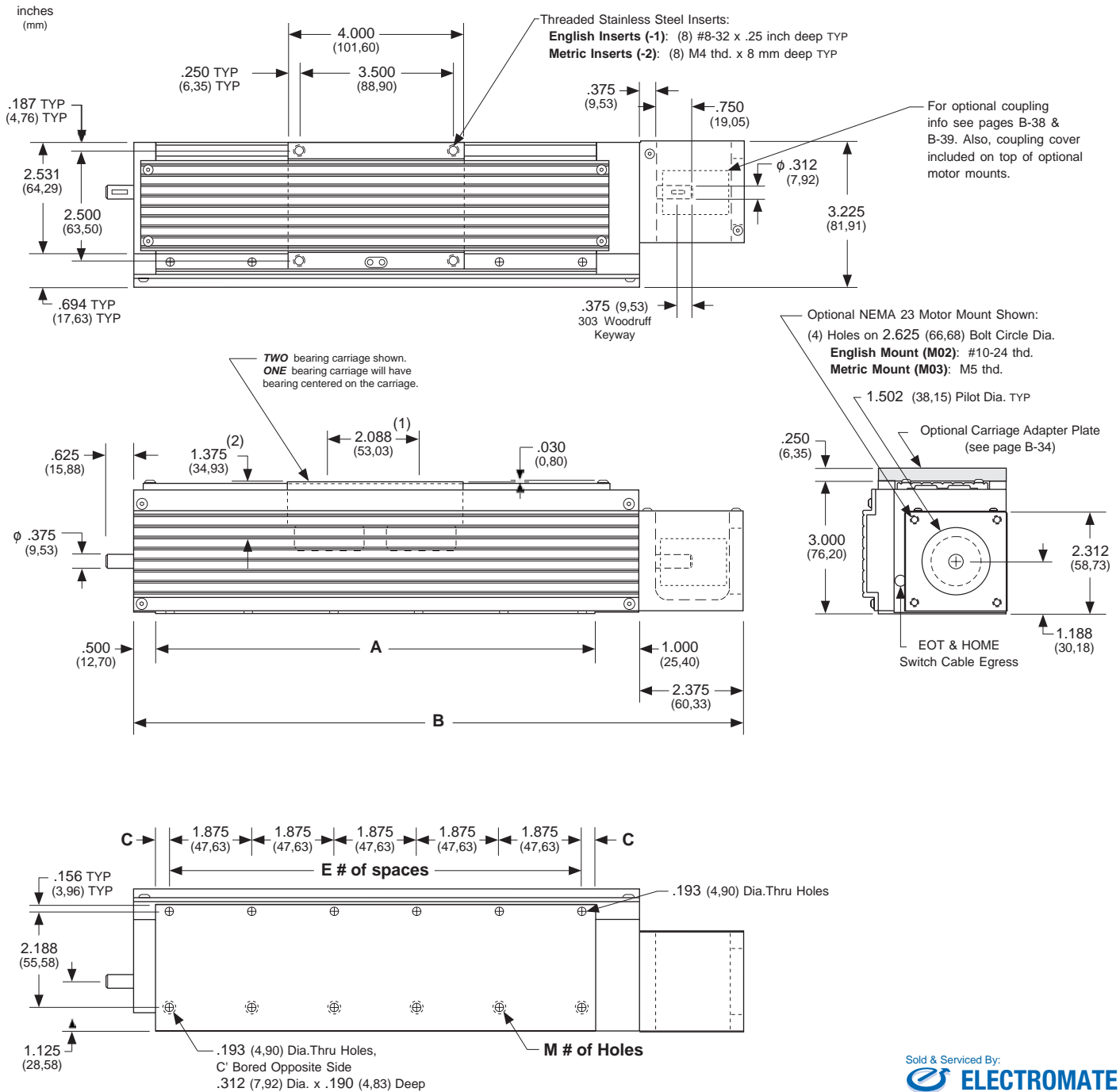
- x = 1; Carriage has 1 bearing; Carriage weight = 1.4 lbs. (0,64 kg)
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 1 bearing carriage [1.1 lbs (0,55 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 2 bearing carriage add 0.1 lbs (0,05 kg) to each value.

Dimensions

- With Top & Side Cover Plates -



- (1) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (2) This value is center distance of the bearing to top of carriage plate surface (d_1). Add .250 inch (6,35 mm) if using a carriage adapter plate.

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Note: Any 130 series table can be mounted on top of a second 130 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page B-13 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

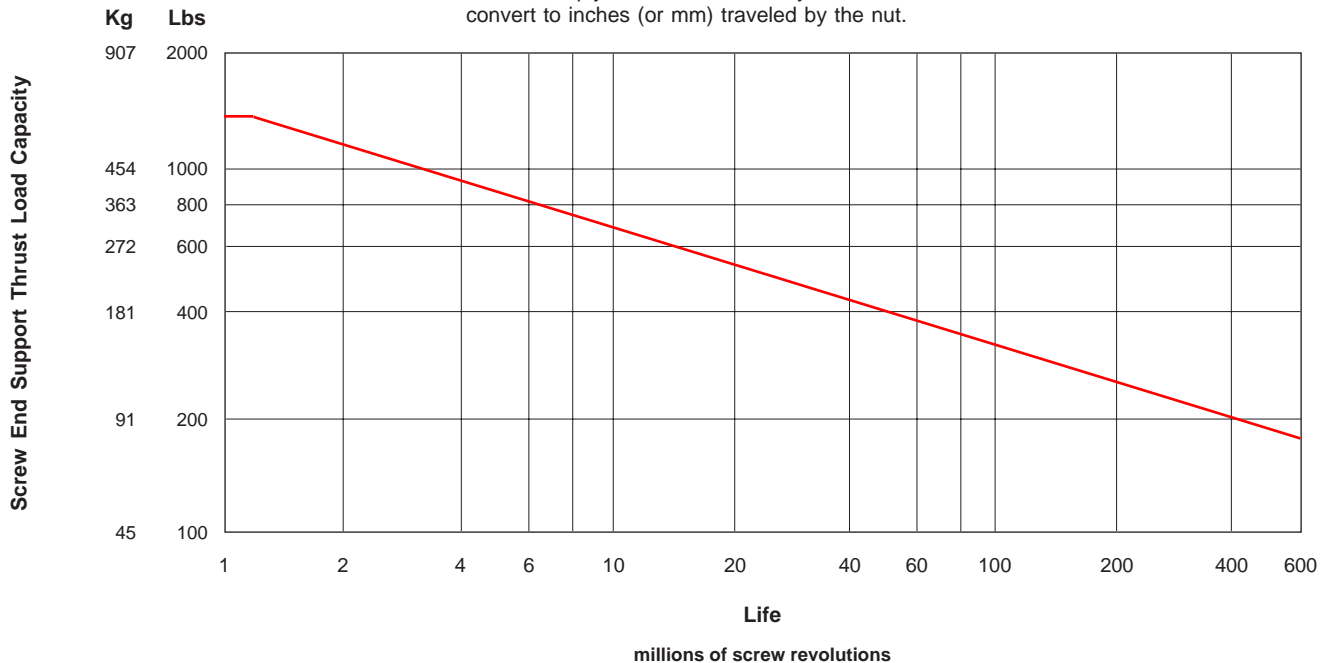
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	1,355 (615)	1,355 (615)	1,145 (519)	665 (302)	395 (179)	305 (138)	180 (82)

Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page B-12 for load/life capacity of the screw end support bearings.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

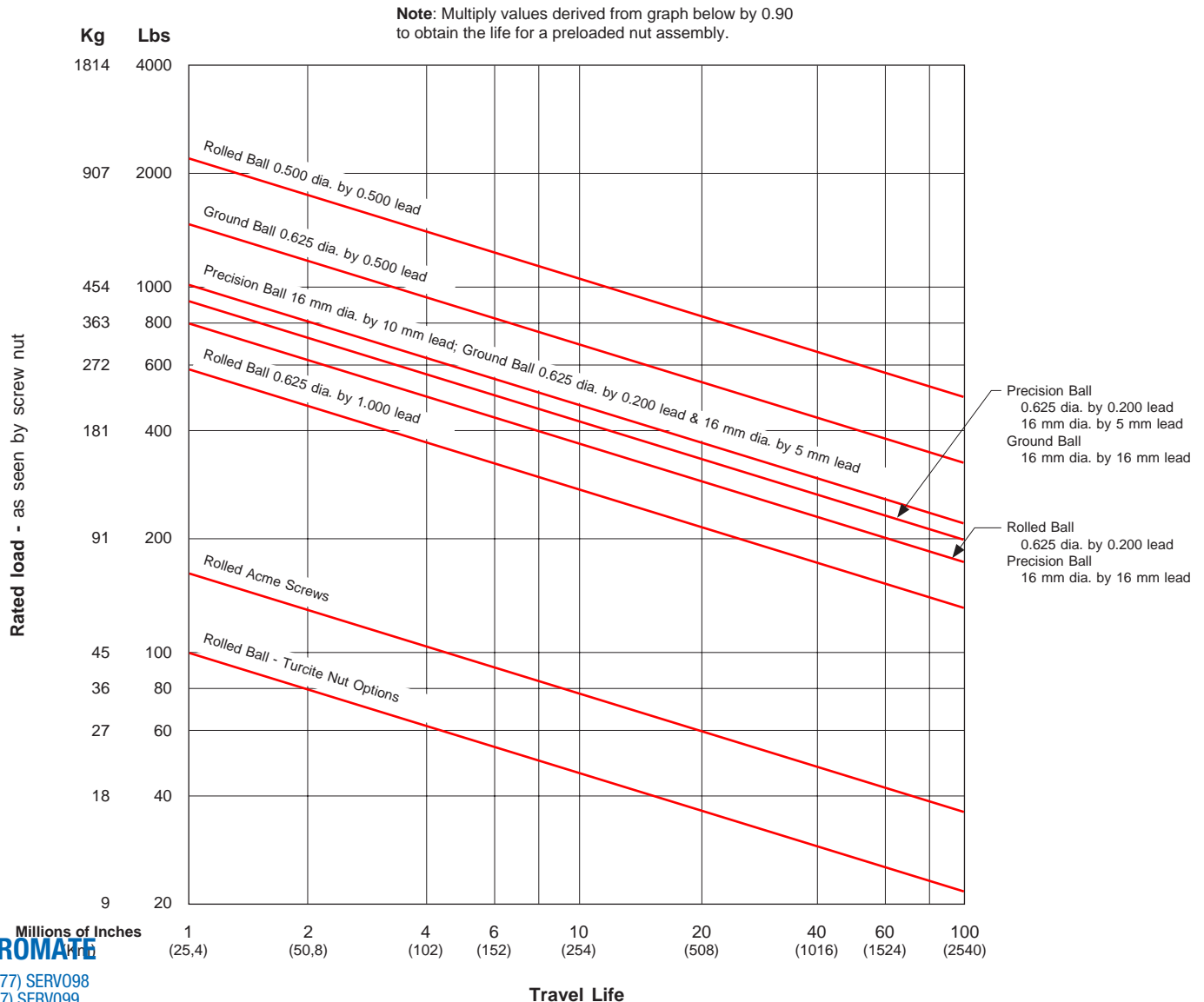
- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages B-22 to B-25)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$



Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 130 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Specifications Subject to Change Without Notice

Screws - Acme & Ball

130 Series		Maximum Safe Table Operating Speed ⁽¹⁾								
		in/sec (mm/sec)								
		Screw								
Model Number	Travel Length inches (mm)	0.500 dia. 0.500 lead	0.625 dia. 0.100 lead	0.625 dia. 0.200 lead	0.625 dia. 0.500 lead	0.625 dia. 1.000 lead	16 mm dia. 4 mm lead	16 mm dia. 5 mm lead	16 mm dia. 10 mm lead	16 mm dia. 16 mm lead
13x402	2 (50)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x404	4 (100)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x406	6 (150)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x408	8 (200)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x412	12 (300)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x416	16 (405)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x420	20 (505)	21.5 (546)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
13x424	24 (605)	16.1 (409)	4.2 (107)	8.4 (213)	21.0 (533)	41.9 (1064)	6.5 (165)	8.2 (208)	16.4 (416)	26.2 (665)
13x430	30 (760)	11.2 (284)	2.9 (74)	5.8 (147)	14.5 (368)	29.0 (737)	4.5 (114)	5.6 (142)	11.3 (287)	18.1 (460)
13x436	36 (910)	8.2 (208)	2.1 (53)	4.2 (107)	10.6 (269)	21.3 (541)	3.3 (84)	4.1 (104)	8.3 (211)	13.3 (338)
13x442	42 (1060)	6.2 (157)	1.6 (41)	3.3 (81)	8.1 (206)	16.3 (414)	2.5 (63)	3.2 (81)	6.3 (160)	10.1 (257)
13x448	48 (1215)	4.9 (124)	1.3 (33)	2.5 (63)	6.4 (162)	12.8 (325)	2.0 (51)	2.5 (63)	5.0 (127)	8.0 (203)
13x454	54 (1370)	4.0 (102)	1.0 (25)	2.0 (51)	5.2 (132)	10.4 (264)	1.6 (41)	2.0 (51)	4.0 (102)	6.5 (165)
13x460	60 (1520)	3.3 (84)	0.8 (20)	1.7 (43)	4.3 (109)	8.6 (218)	1.3 (33)	1.7 (43)	3.3 (84)	5.3 (135)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. **LINTECH** uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.500 inch dia. 0.500 inch lead	<i>Non-preloaded</i> (S001)	2,200 (997)	13,350 (6055)	90	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S002)	1,980 (898)	13,130 (5955)		30 (0,21)			
	<i>Non-preloaded</i> Turcite Nut (S003)	100 (45)	800 (363)	60	25 (0,18)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S004)	90 (41)	800 (363)		40 (0,28)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S005)	800 (363)	6,150 (2790)	90	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S006)	720 (326)	6,070 (2753)		20 (0,14)			
	<i>Non-preloaded</i> Turcite Nut (S007)	100 (45)	800 (363)	60	15 (0,11)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S008)	90 (41)	800 (363)		30 (0,21)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.625 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S009)	590 (267)	2,425 (1100)	90	25 (0,18)	< 0.004 (100)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S010)	530 (240)	2,390 (1084)		40 (0,28)			
	<i>Non-preloaded</i> Turcite Nut (S011)	100 (45)	800 (363)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S012)	90 (41)	800 (363)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
(2) There is a 2.2 inch (55,9 mm) reduction of carriage travel (from the listed travel length) when using a preloaded nut with this screw option.

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Screws - Acme & Ball

SCREW	PRECISION BALL SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S114)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S115)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 5 mm lead	<i>Non-preloaded</i> (S116)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S117)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 10 mm lead	<i>Non-preloaded</i> (S118)	1,080 (489)	2,630 (1192)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	⁽²⁾ <i>Preloaded</i> (S119)	972 (440)	2,365 (1072)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 16 mm lead	<i>Non-preloaded</i> (S120)	819 (371)	1,620 (734)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	⁽³⁾ <i>Preloaded</i> (S121)	737 (334)	1,455 (659)		35 (0,24)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.5 inch (12,7 mm) reduction of carriage travel (from the listed travel length) when using a preloaded nut with this screw option.
- (3) There is a 0.7 inch (17,8 mm) reduction of carriage travel (from the listed travel length) when using a preloaded nut with this screw option.

Screws - Acme & Ball

SCREW	GROUND BALL SCREWS ⁽²⁾							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 dia., 0.200 lead <i>Preloaded</i> (S212)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
0.625 dia., 0.500 lead <i>Preloaded</i> (S213)	1430 (649)	4,191 (1901)	90	30 (0,21)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
16 mm dia., 5 mm lead <i>Preloaded</i> (S214)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
16 mm dia., 16 mm lead <i>Preloaded</i> (S215)	910 (412)	1,800 (816)	90	35 (0,24)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
(2) The Ground Ball Screw options are only available in travel lengths up to 36 inches (910 mm) of travel.

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Screws - Acme & Ball

SCREW	ROLLED ACME SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.625 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S300)	160 (73)	800 (363)	40	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S301)	140 (64)	720 (327)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S302)	160 (73)	800 (363)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S303)	140 (64)	720 (327)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 4 mm lead	<i>Non-preloaded</i> (S304)	160 (73)	800 (363)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S305)	140 (64)	720 (327)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

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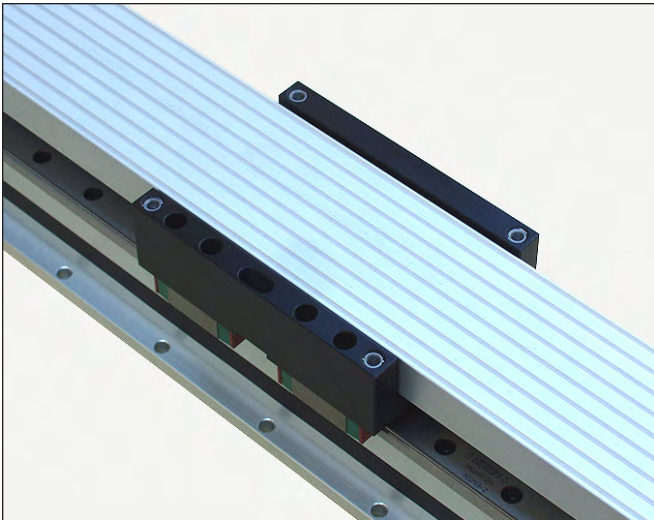
Single or Multiple Axis

LINTECH's 140 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 140 series tables are designed to handle light loads at very high speeds. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. The drive system uses two pulleys, along with a high strength, steel reinforced polyurethane belt, which provides 3.543 inches (90 mm) of linear movement per revolution of the input shaft. The simple belt tensioning system allows for easy adjustment of belt tension by the user. NEMA 23 & 34 motor mounts, or gearhead mounts are available as well as planetary gearheads.



Available Options

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

End of Travel and Home Switches

The 140 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Motor Adapter Brackets

NEMA 34 or any metric mount motor can be mounted to a 140 series positioning table with the use of adapter brackets.

Rotary Encoders

Incremental rotary encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Other

The 140 series tables can accommodate **chrome plated linear bearings & rails** for corrosive environment applications and **power-off electric brakes** for load locking applications.

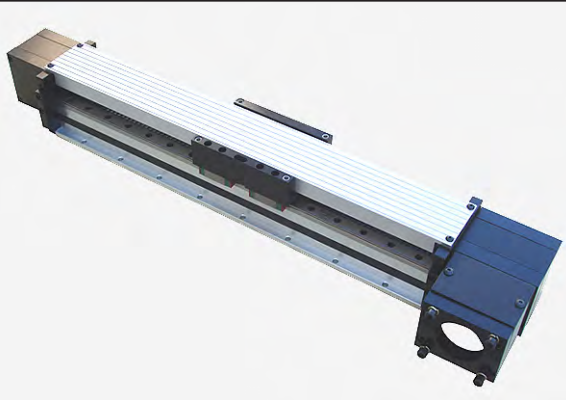
Standard Features - 140 Series

- ❑ Compact 2.875 inches (73 mm) wide by 3.000 inches (76 mm) tall
- ❑ Travel lengths from 4 inches (100 mm) to 10 feet (3,0 meters)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ Polyurethane belt with high strength steel tension members
- ❑ 0° F to +176° F (-18° C to +80° C) operating temperature
- ❑ Single screw belt tensioning with self locking thread
- ❑ Dynamic Load Capacity to 200 lbs (90 kg)
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design
- ❑ 1 rail, 1 or 2 bearing carriages

140-CP0 Series



140-CP1 Series



140-CP2 Series



Options - 140 Series

- ❑ AUTOCAD® drawings available via the internet
- ❑ End of travel (EOT) and home switches wired
- ❑ Adapter brackets for non-NEMA motors
- ❑ Chrome plated linear bearings & rails
- ❑ Rotary incremental encoders
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Carriage adapter plates
- ❑ Vertical angle bracket
- ❑ Motor couplings

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14 **2** **4** **004** - **CP1** - **1** - **D1** - **M02** - **C155** - **L04** - **E00** - **B00**

Table Series

Number of Bearings

- 1** - 1 bearing per carriage
- 2** - 2 bearings per carriage

Carriage Length

- 4** - 4 inches

Travel Length (see pages B-24, B-26 & B-28)

- 004** - 4 to 120 inches

Cover Plate

- CP0** - no cover plate
- CP1** - top cover plate only
- CP2** - top & side cover plates

Carriage Inserts (see pages B-25, B-27 & B-29)

- 1** - English mount
- 2** - Metric mount

Drive Shaft (see pages B-25, B-27 & B-29)

- D1** - Right Hand single shaft
- D2** - Left Hand single shaft
- D3** - Right Hand thru shaft
- D4** - Left Hand thru shaft

Motor Mount (see pages B-25, B-27, B-29 & B-42)

- M00** - none
- M99** - other
- M02** - NEMA 23 mount (E)
- M03** - NEMA 23 mount (M)
- M04** - NEMA 34 mount (E)
- M05** - NEMA 34 mount (M)

Coupling Options (see pages B-38 & B-39)

- C000** - none
- C999** - none
- C130 to C134** - H100
- C155 to C164** - H131
- C190 to C200** - H163
- C407 to C413** - G100
- C435 to C444** - G126
- C470 to C480** - G158

Limit & Home Switches (see pages B-35 to B-37)

- | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|
| L00 - no switches | | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L04 | L07 | L10 | L13 |
| | EOT switches only | L05 | L08 | L11 | L14 |
| | home switch only | L06 | L09 | L12 | L15 |

Encoder Options (see page B-45)

- E00** - none
- E01** - rotary (500 lines/rev)
- E02** - rotary (1000 lines/rev)
- E03** - rotary (1270 lines/rev)
- E99** - other

note: When selecting any rotary encoder option, the Drive Shaft D3 or D4 above is required.

Power-off Brakes (see page B-44)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other

note: When selecting any brake option, the Drive Shaft D3 or D4 above is required.

(E) - English Interface
(M) - Metric Interface

Specifications

Load Capacities		One (1) Bearing Carriage	Two (2) Bearing Carriage
Dynamic Horizontal	2 million inches (50 km) of travel	100 lbs (45 kg)	200 lbs (90 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	34 lbs (15 kg)	68 lbs (30 kg)
Static Horizontal		200 lbs (90 kg)	400 lbs (180 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	8 ft-lbs (11 N-m)	16 ft-lbs (22 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	3 ft-lbs (4 N-m)	5 ft-lbs (7 N-m)
Static Roll Moment		14 ft-lbs (19 N-m)	28 ft-lbs (38 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	4 ft-lbs (5,4 N-m)	15 ft-lbs (20 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	1 ft-lbs (1,9 N-m)	5 ft-lbs (7 N-m)
Static Pitch & Yaw Moment		8 ft-lbs (10 N-m)	30 ft-lbs (40 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	100 lbs (45 kg)	100 lbs (45 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	34 lbs (15 kg)	34 lbs (15 kg)
Each Bearing Static Load Capacity		200 lbs (90 kg)	200 lbs (90 kg)
Maximum Belt Tensile Force		250 lbs (113 kg)	250 lbs (113 kg)
Maximum Carriage Thrust Force		115 lbs (52 kg)	115 lbs (52 kg)
Maximum Speed		78 in/sec (2 m/sec)	78 in/sec (2 m/sec)
Maximum Acceleration		193 in/sec ² (4,9 m/sec ²)	386 in/sec ² (9,8 m/sec ²)
d₂	Center to center distance (spacing) of each bearing on a single rail	-	2.088 in (53,0 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.375 in (34,9 mm)	1.375 in (34,9 mm)

Other	For One (1) & Two (2) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate - 6061 anodized aluminum
Linear Rail Material	Stainless Steel
Belt Properties	Black, 16 mm wide, Polyurethane, Steel reinforced belt
Drive Pulley Weight	0.21 lbs (0,10 kg)
Drive Pulley Diameter	1.128 in (28,65 mm)
Drive Lead	3.543 in (90,00 mm)
Belt Stretch - x Load (lbs or N)	0.00025 in/ft per lbs (0,00476 mm/m per N)
Unidirectional Repeatability	+/- 0.001 in (+/- 0,0254 mm)
Bidirectional Repeatability	+/- 0.004 in (+/- 0,1016 mm)
Position Accuracy (Belt) ⁽¹⁾	< 0.010 in/ft (< 0,254 mm/300mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Breakaway Torque	< 40 oz-in (0,282 N-m)
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, and Gearheads
Coupling	Two (2) different styles available

Footnotes:

(1) Position accuracy varies based on belt stretch. The given rating is based upon a carriage speed of 5 inches/sec (127 mm/sec) and a no load condition.

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Belt Weight ounces (gm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
14x4004-CP0	4 (100)	8.0 (203,2)	14.0 (355,6)	1.188 (30,2)	3	8	1.3 (36,8)	4.8 (2,2)
14x4006-CP0	6 (150)	10.0 (254,0)	16.0 (406,4)	0.313 (8,0)	5	12	1.5 (42,5)	5.3 (2,4)
14x4008-CP0	8 (200)	12.0 (304,8)	18.0 (457,2)	1.313 (33,4)	5	12	1.7 (48,2)	5.8 (2,6)
14x4012-CP0	12 (300)	16.0 (406,4)	22.0 (558,8)	1.438 (36,5)	7	16	2.1 (59,5)	6.3 (2,9)
14x4016-CP0	16 (405)	20.0 (508,0)	26.0 (660,4)	1.563 (39,7)	9	20	2.5 (70,9)	7.3 (3,3)
14x4020-CP0	20 (505)	24.0 (609,6)	30.0 (762,0)	1.688 (42,9)	11	24	2.9 (82,2)	8.3 (3,8)
14x4024-CP0	24 (605)	28.0 (711,2)	34.0 (863,6)	1.813 (46,1)	13	28	3.3 (93,6)	9.3 (4,2)
14x4030-CP0	30 (760)	34.0 (863,6)	40.0 (1016,0)	1.063 (27,0)	17	36	3.9 (110,6)	10.3 (4,7)
14x4036-CP0	36 (910)	40.0 (1016,0)	46.0 (1168,4)	0.313 (8,0)	21	44	4.5 (127,6)	11.8 (5,4)
14x4042-CP0	42 (1060)	46.0 (1168,4)	52.0 (1320,8)	1.438 (36,5)	23	48	5.1 (144,6)	13.3 (6,0)
14x4048-CP0	48 (1215)	52.0 (1320,8)	58.0 (1473,2)	0.688 (17,5)	27	56	5.7 (161,6)	14.8 (6,7)
14x4054-CP0	54 (1370)	58.0 (1473,2)	64.0 (1625,6)	1.813 (46,1)	29	60	6.3 (178,6)	16.3 (7,4)
14x4060-CP0	60 (1520)	64.0 (1625,6)	70.0 (1778,0)	1.063 (27,0)	33	68	6.9 (195,6)	17.8 (8,1)
14x4072-CP0	72 (1820)	76.0 (1930,4)	82.0 (2082,8)	0.500 (12,7)	39	80	8.1 (229,6)	20.8 (9,4)
14x4084-CP0	84 (2130)	88.0 (2235,2)	94.0 (2387,6)	0.875 (22,2)	45	92	9.3 (263,7)	23.8 (10,8)
14x4096-CP0	96 (2435)	100.0 (2540,0)	106.0 (2692,4)	0.313 (8,0)	51	104	10.5 (297,7)	26.8 (12,2)
14x4108-CP0	108 (2740)	112.0 (2844,8)	118.0 (2997,2)	0.688 (17,5)	57	116	11.7 (331,7)	29.8 (13,5)
14x4120-CP0	120 (3045)	124.0 (3149,6)	130.0 (3302,0)	1.063 (27,0)	63	128	12.9 (365,7)	32.8 (14,9)

{

 x = 1; Carriage has 1 bearing; Carriage weight = 1.4 lbs. (0,64 kg)
 x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)

Footnotes:

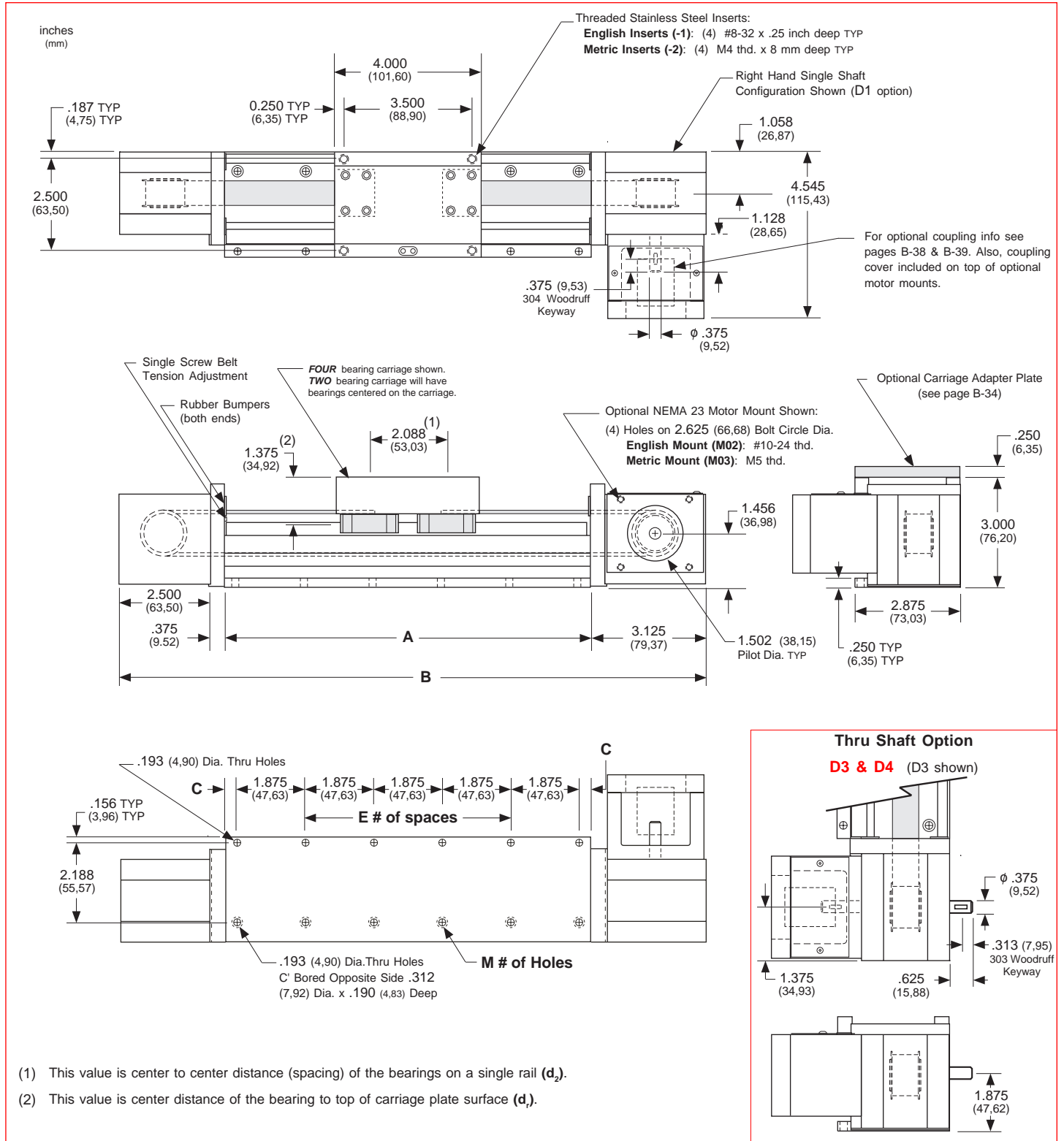
(1) Weight shown is with a 1 bearing carriage [1.4 lbs (0,64 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 2 bearing carriage add 0.1 lbs (0,04 kg) to each value.

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Dimensions

- Without Cover Plates -



Note: Any 130 or 140 series table can be mounted on top of a second 130 or 140 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Belt Weight ounces (gm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
14x4004-CP1	4 (100)	8.0 (203,2)	14.0 (355,6)	1.188 (30,2)	3	8	1.3 (36,8)	4.8 (2,2)
14x4006-CP1	6 (150)	10.0 (254,0)	16.0 (406,4)	0.313 (8,0)	5	12	1.5 (42,5)	5.3 (2,4)
14x4008-CP1	8 (200)	12.0 (304,8)	18.0 (457,2)	1.313 (33,4)	5	12	1.7 (48,2)	5.8 (2,6)
14x4012-CP1	12 (300)	16.0 (406,4)	22.0 (558,8)	1.438 (36,5)	7	16	2.1 (59,5)	6.3 (2,9)
14x4016-CP1	16 (405)	20.0 (508,0)	26.0 (660,4)	1.563 (39,7)	9	20	2.5 (70,9)	7.3 (3,3)
14x4020-CP1	20 (505)	24.0 (609,6)	30.0 (762,0)	1.688 (42,9)	11	24	2.9 (82,2)	8.3 (3,8)
14x4024-CP1	24 (605)	28.0 (711,2)	34.0 (863,6)	1.813 (46,1)	13	28	3.3 (93,6)	9.3 (4,2)
14x4030-CP1	30 (760)	34.0 (863,6)	40.0 (1016,0)	1.063 (27,0)	17	36	3.9 (110,6)	10.3 (4,7)
14x4036-CP1	36 (910)	40.0 (1016,0)	46.0 (1168,4)	0.313 (8,0)	21	44	4.5 (127,6)	11.8 (5,4)
14x4042-CP1	42 (1060)	46.0 (1168,4)	52.0 (1320,8)	1.438 (36,5)	23	48	5.1 (144,6)	13.3 (6,0)
14x4048-CP1	48 (1215)	52.0 (1320,8)	58.0 (1473,2)	0.688 (17,5)	27	56	5.7 (161,6)	14.8 (6,7)
14x4054-CP1	54 (1370)	58.0 (1473,2)	64.0 (1625,6)	1.813 (46,1)	29	60	6.3 (178,6)	16.3 (7,4)
14x4060-CP1	60 (1520)	64.0 (1625,6)	70.0 (1778,0)	1.063 (27,0)	33	68	6.9 (195,6)	17.8 (8,1)

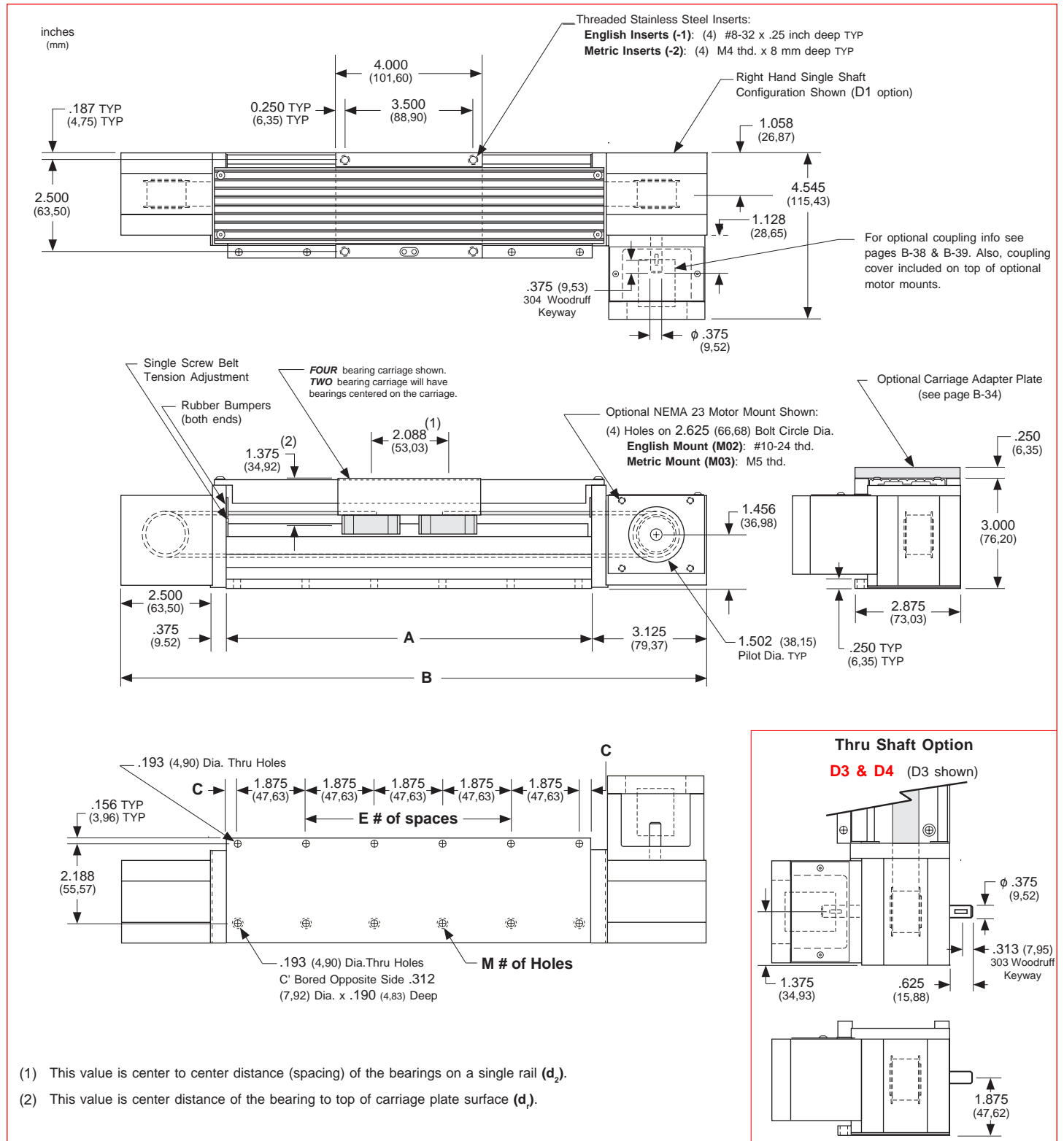
- x = 1; Carriage has 1 bearing; Carriage weight = 1.4 lbs. (0,64 kg)
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)

Footnotes:

(1) Weight shown is with a 1 bearing carriage [1.4 lbs (0,64 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 2 bearing carriage add 0.1 lbs (0,04 kg) to each value.

Dimensions

- With Top Cover Plate Only -



- (1) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (2) This value is center distance of the bearing to top of carriage plate surface (d_1).

Note: Any 130 or 140 series table can be mounted on top of a second 130 or 140 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Belt Weight ounces (gm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	E	M		
14x4004-CP2	4 (100)	8.0 (203,2)	14.0 (355,6)	1.188 (30,2)	3	8	1.3 (36,8)	5.0 (2,3)
14x4006-CP2	6 (150)	10.0 (254,0)	16.0 (406,4)	0.313 (8,0)	5	12	1.5 (42,5)	5.5 (2,5)
14x4008-CP2	8 (200)	12.0 (304,8)	18.0 (457,2)	1.313 (33,4)	5	12	1.7 (48,2)	6.0 (2,7)
14x4012-CP2	12 (300)	16.0 (406,4)	22.0 (558,8)	1.438 (36,5)	7	16	2.1 (59,5)	6.6 (3,0)
14x4016-CP2	16 (405)	20.0 (508,0)	26.0 (660,4)	1.563 (39,7)	9	20	2.5 (70,9)	7.7 (3,5)
14x4020-CP2	20 (505)	24.0 (609,6)	30.0 (762,0)	1.688 (42,9)	11	24	2.9 (82,2)	8.7 (3,9)
14x4024-CP2	24 (605)	28.0 (711,2)	34.0 (863,6)	1.813 (46,1)	13	28	3.3 (93,6)	9.8 (4,5)
14x4030-CP2	30 (760)	34.0 (863,6)	40.0 (1016,0)	1.063 (27,0)	17	36	3.9 (110,6)	10.9 (5,0)
14x4036-CP2	36 (910)	40.0 (1016,0)	46.0 (1168,4)	0.313 (8,0)	21	44	4.5 (127,6)	12.5 (5,7)
14x4042-CP2	42 (1060)	46.0 (1168,4)	52.0 (1320,8)	1.438 (36,5)	23	48	5.1 (144,6)	14.0 (6,4)
14x4048-CP2	48 (1215)	52.0 (1320,8)	58.0 (1473,2)	0.688 (17,5)	27	56	5.7 (161,6)	15.6 (7,1)
14x4054-CP2	54 (1370)	58.0 (1473,2)	64.0 (1625,6)	1.813 (46,1)	29	60	6.3 (178,6)	17.2 (7,8)
14x4060-CP2	60 (1520)	64.0 (1625,6)	70.0 (1778,0)	1.063 (27,0)	33	68	6.9 (195,6)	18.8 (8,5)

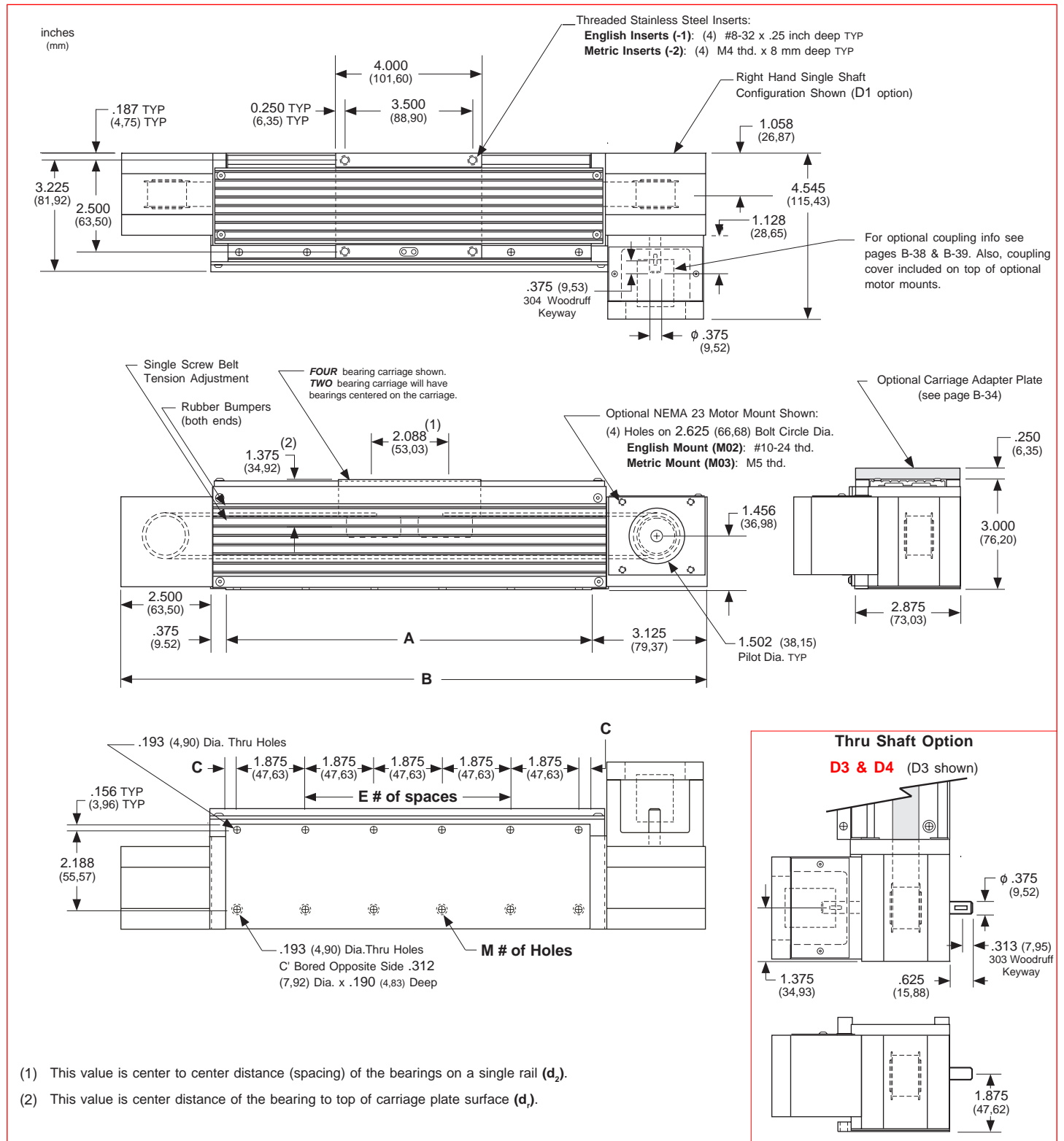
- x = 1; Carriage has 1 bearing; Carriage weight = 1.4 lbs. (0,64 kg)
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)

Footnotes:

(1) Weight shown is with a 1 bearing carriage [1.4 lbs (0,64 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 2 bearing carriage add 0.1 lbs (0,04 kg) to each value.

Dimensions

- With Top Cover Plate Only -



- (1) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (2) This value is center distance of the bearing to top of carriage plate surface (d_1).

Note: Any 130 or 140 series table can be mounted on top of a second 130 or 140 series table, in order to create X-Y multiple axis configurations. **LINTECH** recommends that a 2 bearing carriage be used for the bottom axis, and that the top axis should never extend out more than 18 inches in either direction, from the bottom axis carriage edge, without the use of a support bearing system on the outer edges of the top axis. The 130-CP1, 130-CP2 or 140 series requires a **Carriage Adapter Plate** option. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no adapter bracket or extra machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 or 120 series tables should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Maximum Motor Input Torque, Maximum Belt Force, & Maximum Acceleration Rate

Maximum Motor Input Torque

The maximum safe speed/torque of a motor/drive system that can be used with the 140 series, is limited by the belt strength at a given speed. The maximum linear forces the belt can adequately handle are determined by the number of teeth on the pulley and the belt width. The chart below illustrates the relationship between motor input torque/belt force and carriage speed. Care should be taken when sizing and selecting a motor/drive system for use with a 140 series table. Exceeding the maximum input torque values at the listed speeds can cause belt "skipping" over pulley teeth. This will result in mis-positioning of the carriage.

Maximum Acceleration

The maximum acceleration rate using a 140 series table can be determined by the simple equation $F = M \times A$. Knowing the mass of the load, and the maximum safe operating force for the belt, the maximum possible acceleration rate can be determined. **Note:** The mechanical limitation for acceleration of the 140 series table is 1 g.

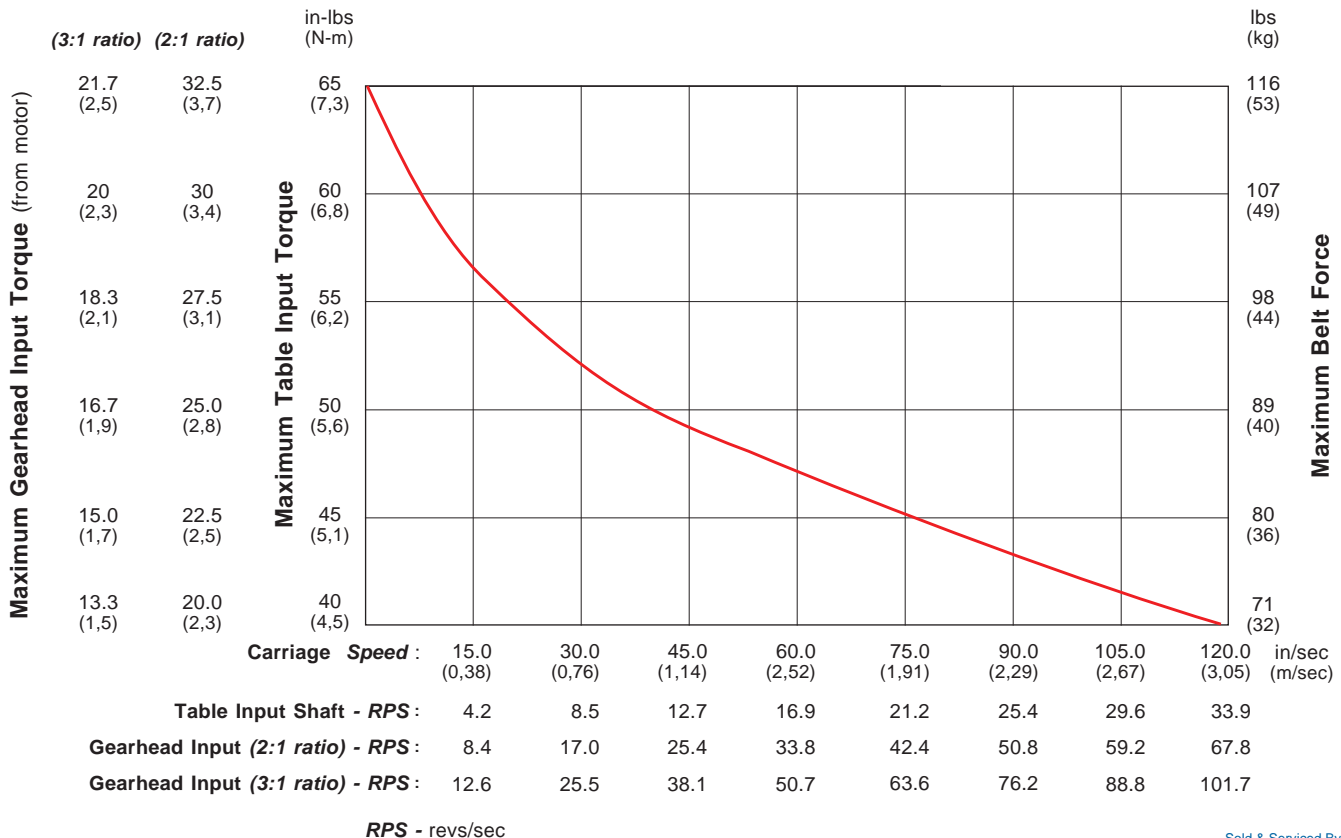
Maximum Acceleration Example

- F** = **M** x **A**
- F** = maximum belt force at desired speed
- M** = user applied load
- A** = maximum acceleration rate (g's)
- Sin ϕ** = angle of table from horizontal (degrees)

<i>Horizontal Application</i>	<i>Vertical Application</i>
$A = \frac{F}{M}$	$A = \frac{F - M \sin \phi}{M}$

Example: A 30 lb load is mounted to a 140 series carriage in a horizontal application. Determine the maximum acceleration rate in g's & in/sec² that can be used to achieve a maximum speed of 75 IPS.

- Step 1:** From graph below, determine the maximum belt force at 75 IPS : (**F = 80 lbs**)
- Step 2:** Add up your total mass = load weight + carriage weight : (**M = 30 + 1.8 = 31.8 lbs**)
- Step 3:** Solve for A : (**A = 80/31.8 = 2.5 g's**)
- Note:** 1 g = 386 in/sec²
- Step 4:** 2.5 g's x 386 = 968 in/sec²
- Step 5:** Cannot exceed the 1.0 g mechanical limitation.



1) Table friction & breakaway forces have already been deducted from the above maximum belt force values.
 2) Curve based upon maximum belt values. Select a motor coupling that can handle the required torque.

Master/Slave 140 Series Configuration

For some X-Y belt drive applications, the master/slave configuration shown to the right may be required. This system provides two bottom (X) axes spread apart a set distance, yet driven by one motor. The spreading of the two bottom axes minimizes the deflection on the Y axis, reduces the moment loading on the X axes carriages, increases the system rigidity, and prevents twisting of the Y axis as it accelerates to a set speed. **LINTECH** can provide the shaft supports, the cross shaft, the couplings, and the 140 series belt drive table without a motor mount bracket. The shaft supports are required as the couplings DO NOT provide adequate support of the shaft by themselves. Also, the shaft supports prevent the cross shaft from "whipping" at long lengths and high speeds.

The chart below lists the maximum carriage speed available with a given distance between shaft supports. A minimum of two shaft supports is always required. More than two can be used to increase the speed of a longer spread system. The equations below show the relationship between the # of shaft supports, the spread between the two bottom axes (B), and the distance between individual shaft supports (A).

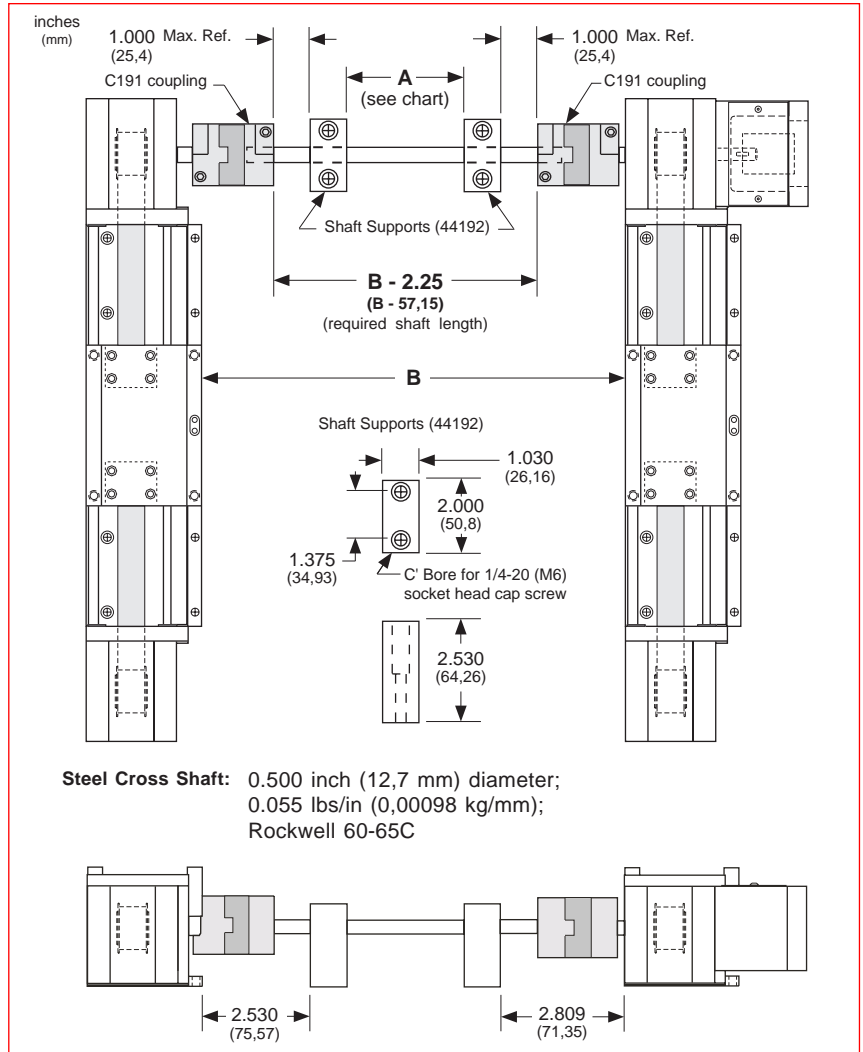
A = distance between shaft supports

B = distance between 2 bottom axes

2 Shaft Supports: **A** = [B - 7.50 in (190,5 mm)]

3 Shaft Supports: **A** = [B - 8.53 in (216,7 mm)] / 2

4 Shaft Supports: **A** = [B - 9.56 in (242,8 mm)] / 3



Maximum Distance Between Shaft Supports		Maximum Shaft Speed (RPM)	Equivalent Carriage Speed	
A			(in/sec)	(mm/sec)
(inches)	(mm)			
<= 30	762	2000	118	3000
<= 36	914	1500	89	2250
<= 48	1219	840	50	1260
<= 54	1372	660	39	990
<= 60	1524	535	32	802
<= 66	1676	440	26	660
<= 72	1829	370	22	555
<= 84	2134	270	16	405
<= 96	2438	208	12	312
<= 108	2743	164	10	246
<= 120	3048	133	8	200

Note: The user is required to supply the mounting surface for the above configurations. **LINTECH** normally only supplies all the positioning hardware. A common base plate can be provided by **LINTECH** upon request.

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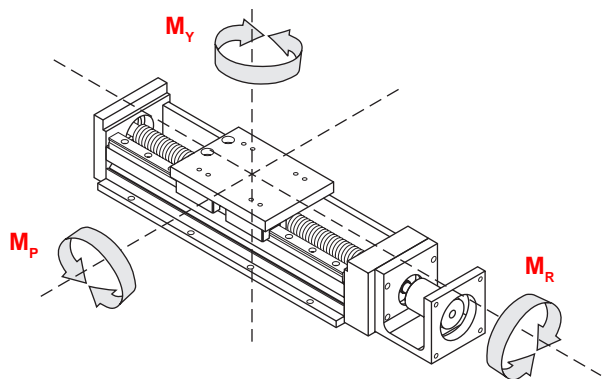
Specifications subject to change without notice

Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 130 or 140 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

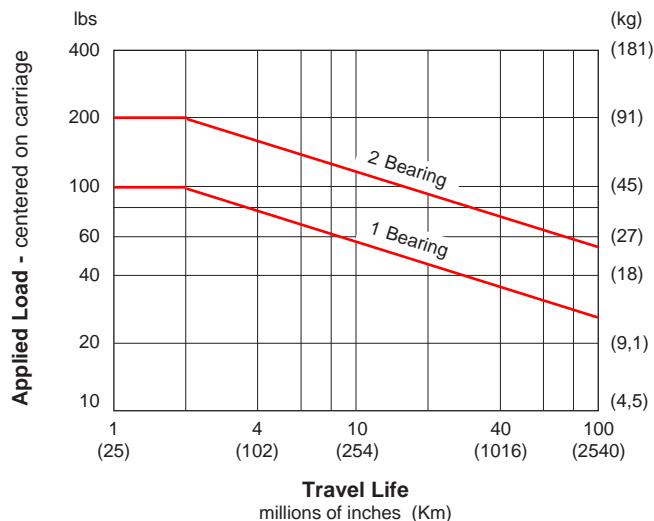
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		1 Bearing		2 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	100	(45)	200	(90)
50	(1270)	34	(15)	68	(30)
100	(2540)	27	(12)	54	(24)

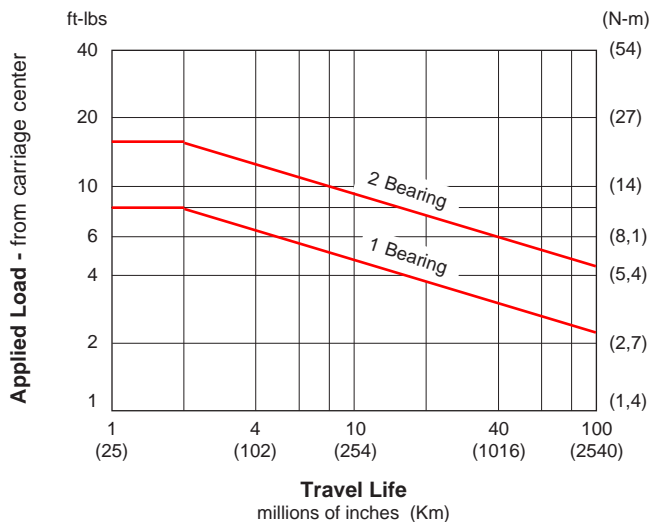


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		1 Bearing		2 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	8.0	(10,8)	16	(22)
50	(1270)	2.7	(3,7)	5	(7)
100	(2540)	2.2	(3,0)	4	(5)

Ratings are based on $d_3 = 12$ inches (305 mm) & $d_4 = 0$



Dynamic Moment Load (M_P & M_Y) Capacity

Load applied away from Carriage Center

travel life		1 Bearing		2 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	4.0	(5,4)	15	(20)
50	(1270)	1.4	(1,9)	5	(7)
100	(2540)	1.1	(1,5)	4	(5)

Ratings are based on $d_3 = 0$ & $d_4 = 12$ inches (305 mm)

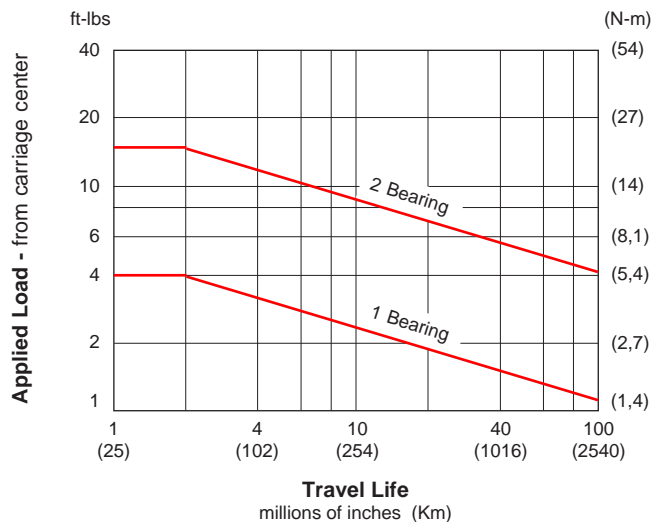
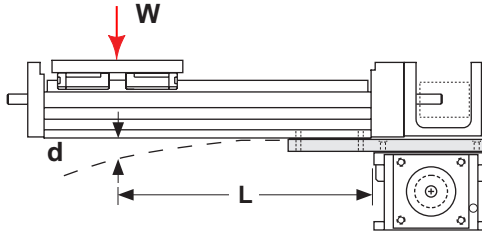


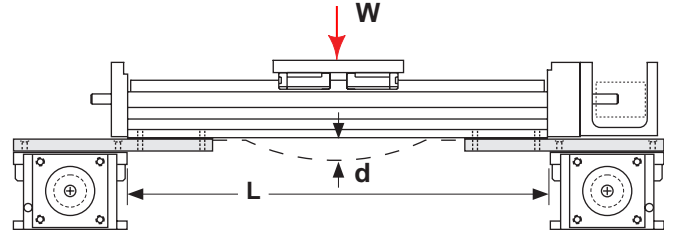
Table Deflection - Multiple Axis Configurations

The following graphs can be used to estimate the deflection value for a given configuration. The information in the graphs was obtained with the bottom axis firmly mounted to a granite surface plate and also includes the deflection of the bottom axis carriage assembly & all mounting hardware. Individual applications will vary depending on the user mounting surface, user mounting hardware, and user mounting configuration. If the deflection values below are too high for your application, a steel sub plate, or aluminum cross member, can be added for additional "Y" axis support. Contact **LINTECH** for more details.

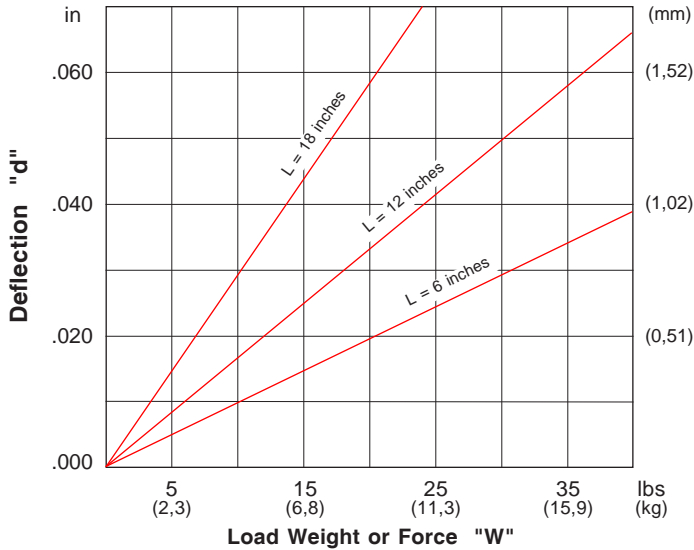
2 Bearing 130 or 140 Series on Top Axis



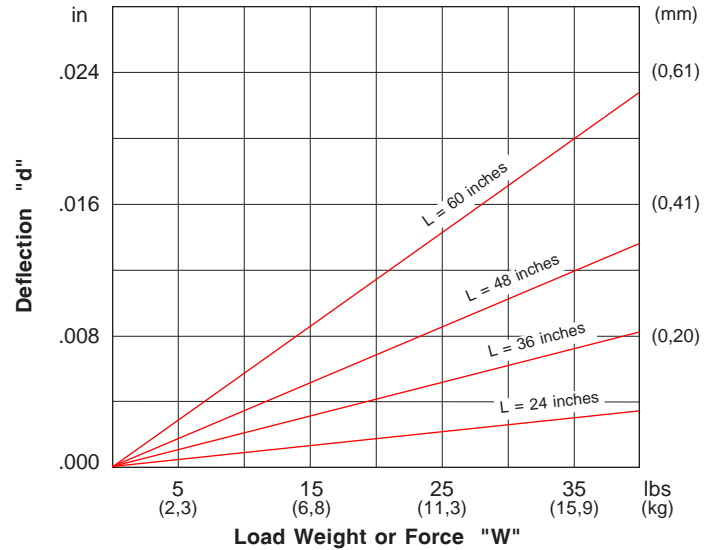
2 Bearing 130 or 140 Series on Top Axis



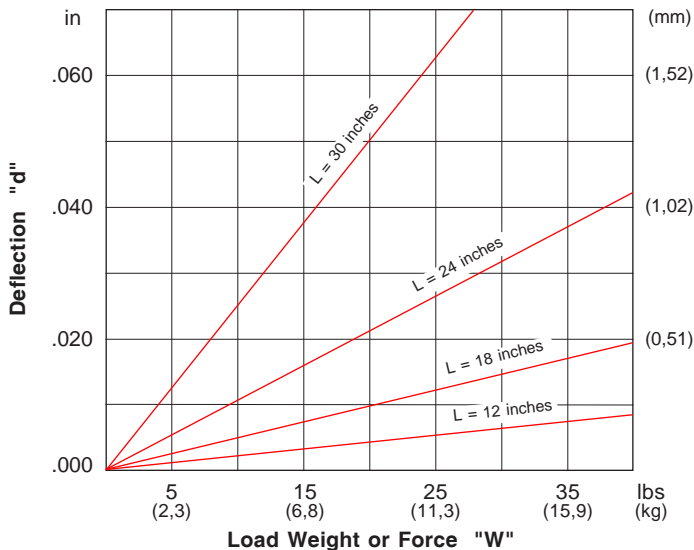
2 Bearing 130 or 140 Series on Bottom Axis



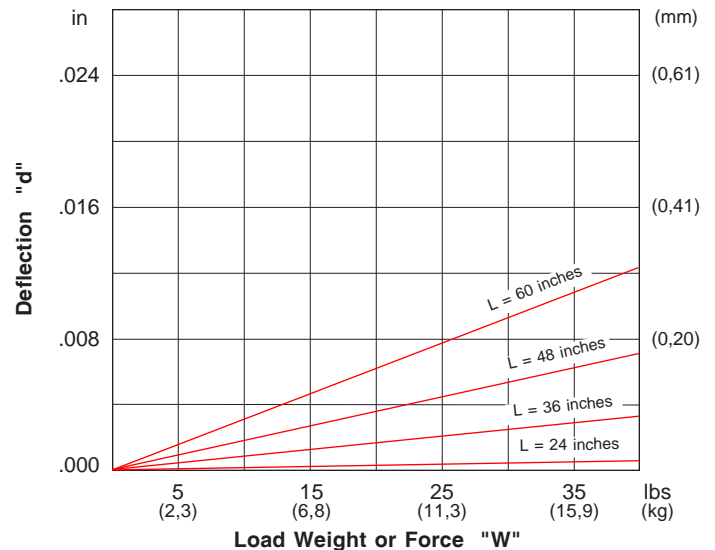
2 Bearing 130 or 140 Series on Bottom Axis



4 Bearing 100 Series on Bottom Axis



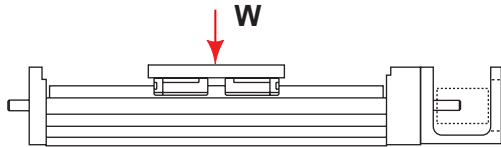
4 Bearing 100 Series on Bottom Axis



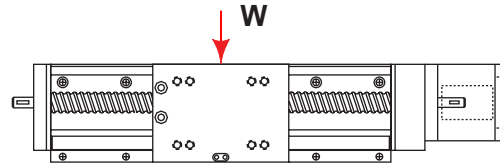
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$$I = 0.61 \text{ in}^4 \text{ (} 2.54 \times 10^5 \text{ mm}^4\text{)}$$



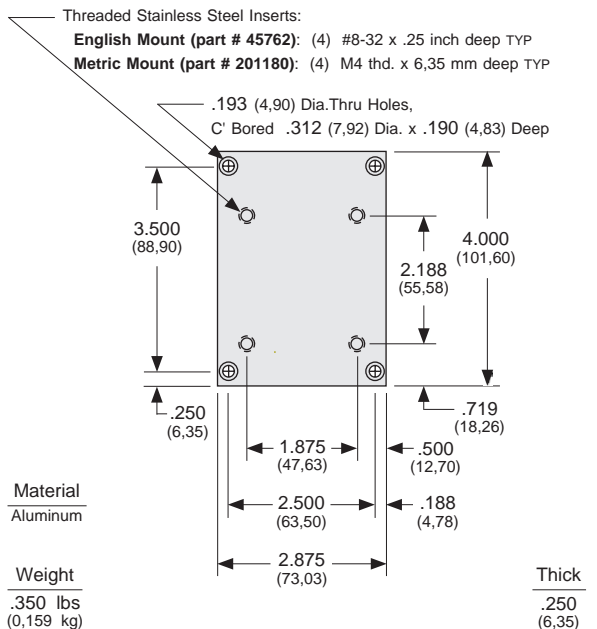
$$I = 1.7 \text{ in}^4 \text{ (} 7.07 \times 10^5 \text{ mm}^4\text{)}$$



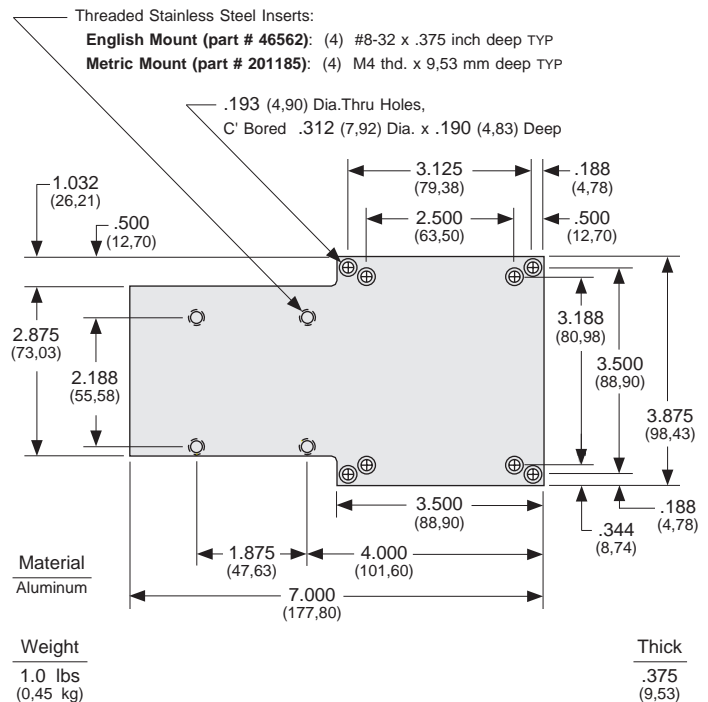
Carriage Adapter Plates

Optional carriage adapter plates assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. One adapter plate allows a 130 or 140 series table to be mounted on top of any 130-CP1, 130-CP2, or 140-CP1 table to make an X-Y axes system. The second adapter plate allows any 130 or 140 series table to be mounted to any **LINTECH** 100, 110, and 120 series table. A precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds.

130/140 series to 130/140 series (-CP1 & -CP2)

inches
(mm)

130/140 series to 100 series

inches
(mm)

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End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a **LINTECH** 130 or 140 series table, each switch is mounted to the side of the table, while the actuating cams are mounted to the carriage assembly. The *T-slot* which runs along the one side of the 130 series, allows the switches to be located anywhere along the table. The switches are pre-wired by **LINTECH** for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

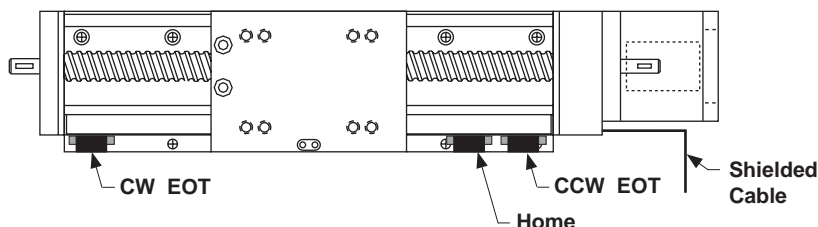
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. **LINTECH** provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located between the EOT switches, near the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from **LINTECH**.



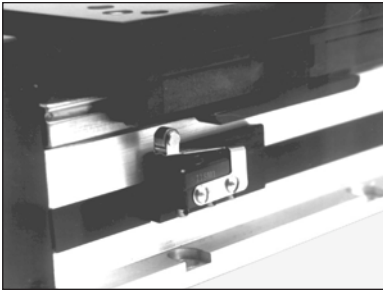
Note: For the 130 or 140 series, EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #.

Note: Each switch can be located anywhere along the T-slot which runs along the entire one side of the table.

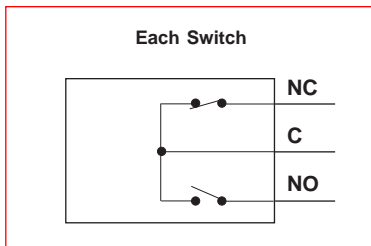
Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. **LINTECH**'s ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

End of Travel (EOT) Switches & Home Switch

Mechanical Switches

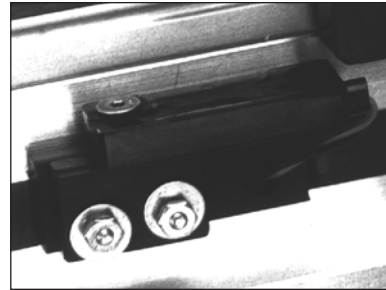
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 amps @ 125 VAC 1 amp @ 85 VDC
Activation Style	: mechanical cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 85° C
Environment	: non wash down
Added Table Width	: 0.063 inch (1,6 mm) (EOT switches) 0.063 inch (1,6 mm) (with Home switch)
Individual Switch Wiring	: none



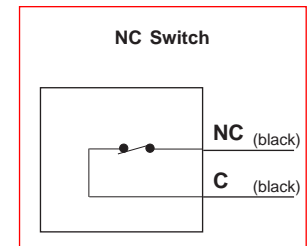
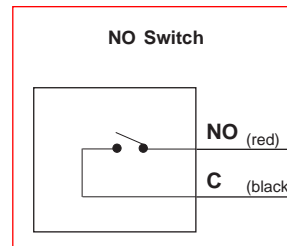
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT	NC
Blue	CW Common	
Red	CCW EOT	NC
White	CCW Common	
Brown	HOME	NO
Green	HOME Common	
Silver	Shield	

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches

Repeatability	: +/- 0.0020 inch (50 microns)
Electrical	: 1.0 amps @ 125 VAC 0.5 amps @ 100 VDC
Activation Style	: magnetic
Activation Area	: 0.30 inches (7,62 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT (black)	NC
Blue	CW Common (black)	
Red	CCW EOT (black)	NC
White	CCW Common (black)	
Brown	HOME (red)	NO
Green	HOME Common (black)	
Silver	Shield	

CW - Clockwise
CCW - Counter Clockwise
EOT - End of Travel
NC - Normally Closed
NO - Normally Open

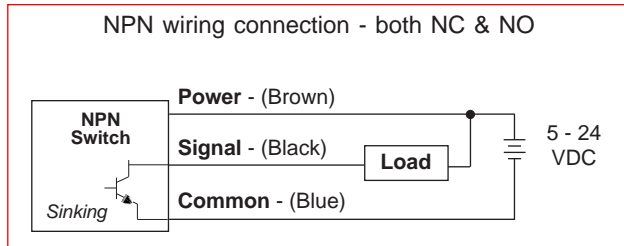
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End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



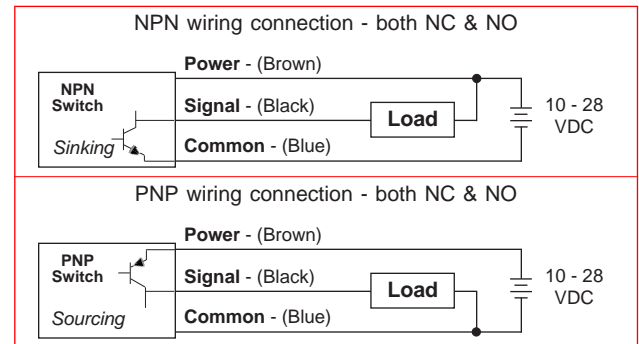
Standard **LINTECH** Wiring : from table end plate, (provided when switch option is ordered with any table) 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 10 - 28 VDC
15 mA - power input
100 mA max - signal
- Actuation Style : non-magnetic cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 75° C
- Environment : IEC IP67 wash down
- Added Table Width : 0.20 inch (5,1 mm) (EOT switches)
0.20 inch (5,1 mm) (Home switch)
- Individual Switch Wiring : 6.5 foot (2 m) cable for NPN
3.3 foot (1 m) cable for PNP

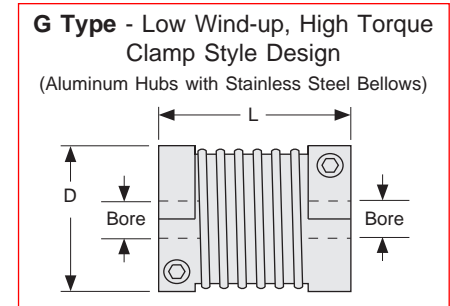
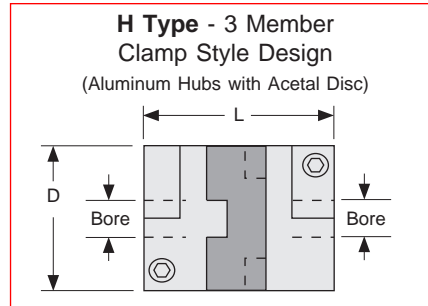
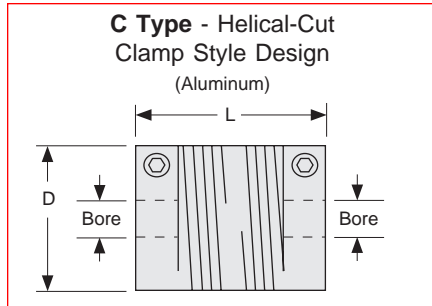


Standard **LINTECH** Wiring : from table end plate, (provided when switch option is ordered with any table) 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model Number	D inches (mm)	L inches (mm)	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
			Table	Motor	Minimum (in) (mm)	Maximum (in) (mm)				
C100-312-aaa	1.00 (25,4)	1.50 (38,1)	312	aaa	.250 6	.375 10	1.5 (43)	.19 (35)	23.0 (0,9)	400 (2,8)
C125-312-aaa ⁽¹⁾	1.25 (31,8)	2.00 (50,8)	312	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)
H100-312-aaa	1.00 (25,4)	1.28 (32,5)	312	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)
H131-312-aaa ⁽¹⁾	1.31 (33,3)	1.89 (48,0)	312	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)
G100-312-aaa	0.99 (25,2)	1.26 (32,0)	312	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)
G126-312-aaa	1.26 (32,1)	1.62 (41,0)	312	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch			005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm		012 = 12 mm 014 = 14 mm 016 = 16 mm				

Footnotes:

(1) This coupling option can not be used with the optional NEMA 23 motor mount because its length is too long. However, this coupling option can be used with the optional NEMA 34 motor mount. Custom motor mounts can be provided upon request. See page B-39 for maximum coupling diameter and length specifications for use with the optional NEMA 23 & 34 motor mounts.

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

Specification	130 Series	130 Series	140 Series	140 Series
	NEMA 23 bracket	NEMA 34 bracket	NEMA 23 bracket	NEMA 34 bracket
	inches (mm)	inches (mm)	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.312 (7,92)	0.312 (7,92)	0.375 (9,53)	0.375 (9,53)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)	1.500 (38,10)	2.000 (50,80)
Maximum coupling length	1.750 (44,45)	2.250 (57,15)	1.900 (48,26)	2.375 (60,32)

Note: Custom brackets available upon request.

Coupling Part Numbers

C020 C100-312-250
C021 C100-312-375
C022 C100-312-006
C023 C100-312-008
C024 C100-312-010

C040 C125-312-250
C041 C125-312-375
C042 C125-312-500
C043 C125-312-006
C044 C125-312-008
C045 C125-312-010
C046 C125-312-012
C047 C125-312-014

C125 H100-312-250
C126 H100-312-375
C127 H100-312-006
C128 H100-312-008
C129 H100-312-010

C130 H100-375-250
C131 H100-375-375
C132 H100-375-006
C133 H100-375-008
C134 H100-375-010

C145 H131-312-250
C146 H131-312-375
C147 H131-312-500
C148 H131-312-625
C149 H131-312-006
C150 H131-312-008
C151 H131-312-010
C152 H131-312-012
C153 H131-312-014
C154 H131-312-016

C155 H131-375-250
C156 H131-375-375
C157 H131-375-500
C158 H131-375-625
C159 H131-375-006
C160 H131-375-008
C161 H131-375-010
C162 H131-375-012
C163 H131-375-014
C164 H131-375-016

C190 H163-375-375
C191 H163-375-500
C192 H163-375-625
C193 H163-375-750
C194 H163-375-010
C195 H163-375-012
C196 H163-375-014
C197 H163-375-016
C198 H163-375-018
C199 H163-375-019
C200 H163-375-020

C400 G100-312-250
C401 G100-312-375
C402 G100-312-500
C403 G100-312-006
C404 G100-312-008
C405 G100-312-010
C406 G100-312-012

C407 G100-375-250
C408 G100-375-375
C409 G100-375-500
C410 G100-375-006
C411 G100-375-008
C412 G100-375-010
C413 G100-375-012

C425 G126-312-250
C426 G126-312-375
C427 G126-312-500
C428 G126-312-625
C429 G126-312-006
C430 G126-312-008
C431 G126-312-010
C432 G126-312-012
C433 G126-312-014
C434 G126-312-016

C435 G126-375-250
C436 G126-375-375
C437 G126-375-500
C438 G126-375-625
C439 G126-375-006
C440 G126-375-008
C441 G126-375-010
C442 G126-375-012
C443 G126-375-014
C444 G126-375-016

C470 G158-375-375
C471 G158-375-500
C472 G158-375-625
C473 G158-375-750
C474 G158-375-010
C475 G158-375-012
C476 G158-375-014
C477 G158-375-016
C478 G158-375-018
C479 G158-375-019
C480 G158-375-020

Vertical Angle Brackets

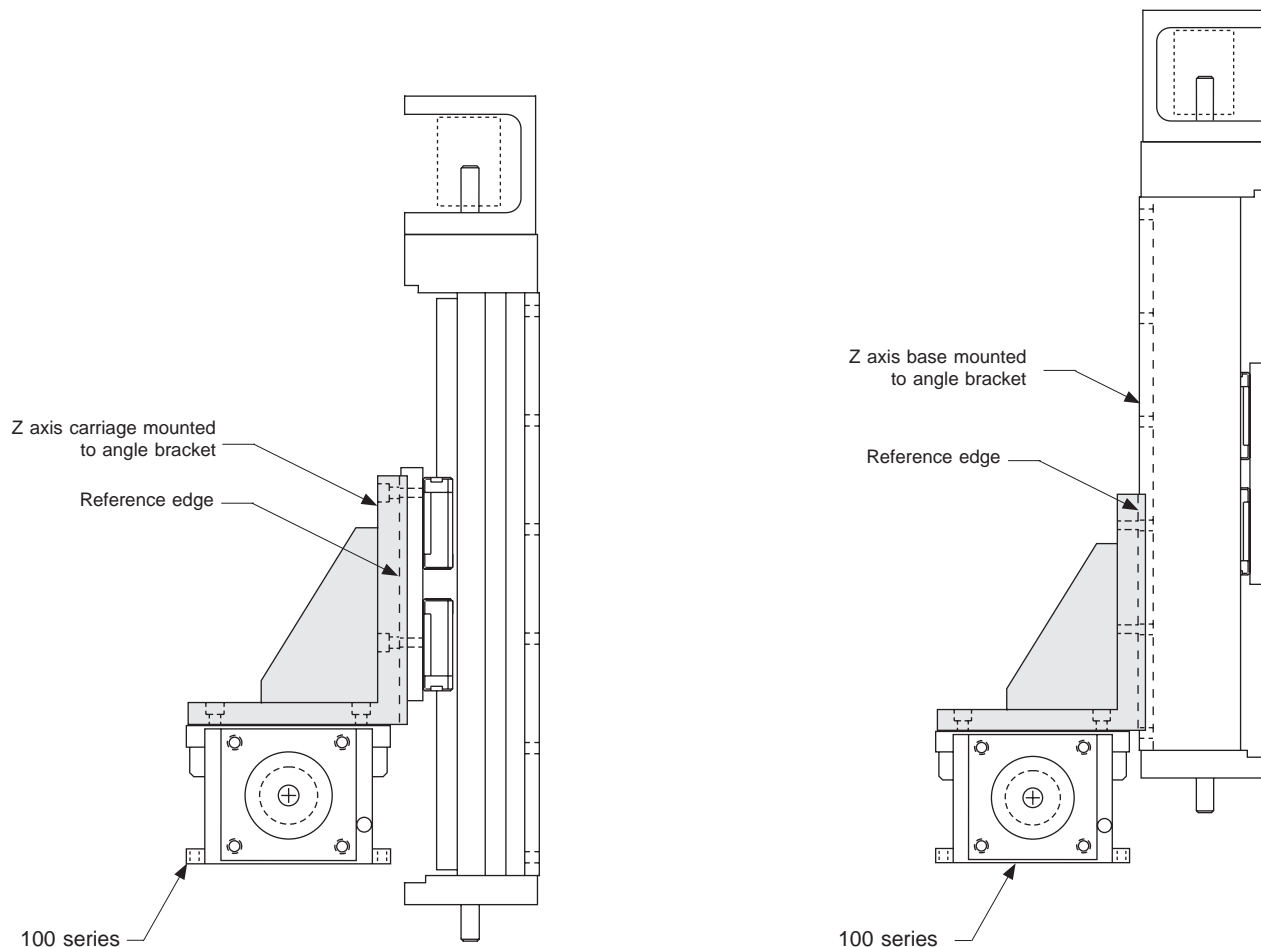
LINTECH has provided a simple solution for those applications requiring a Z axis within a multiple axis configuration. Two different vertical angle brackets are available. One allows a 130 or 140 series Z axis table to be mounted to a second 130 or 140 series table. The other vertical angle bracket allows a 130 or 140 series Z axis table to be mounted to a 100 series table. The 100 series table has a higher dynamic load and moment load capacity.

These precision machined aluminum angle brackets ensure that the orthogonality of the two tables is maintained to < 30 arc-seconds. To achieve this orthogonality, one side of the angle bracket must be mounted to the table carriage with a precision square tool or micrometer depth gauge, while the second axis is mounted securely against the reference edge

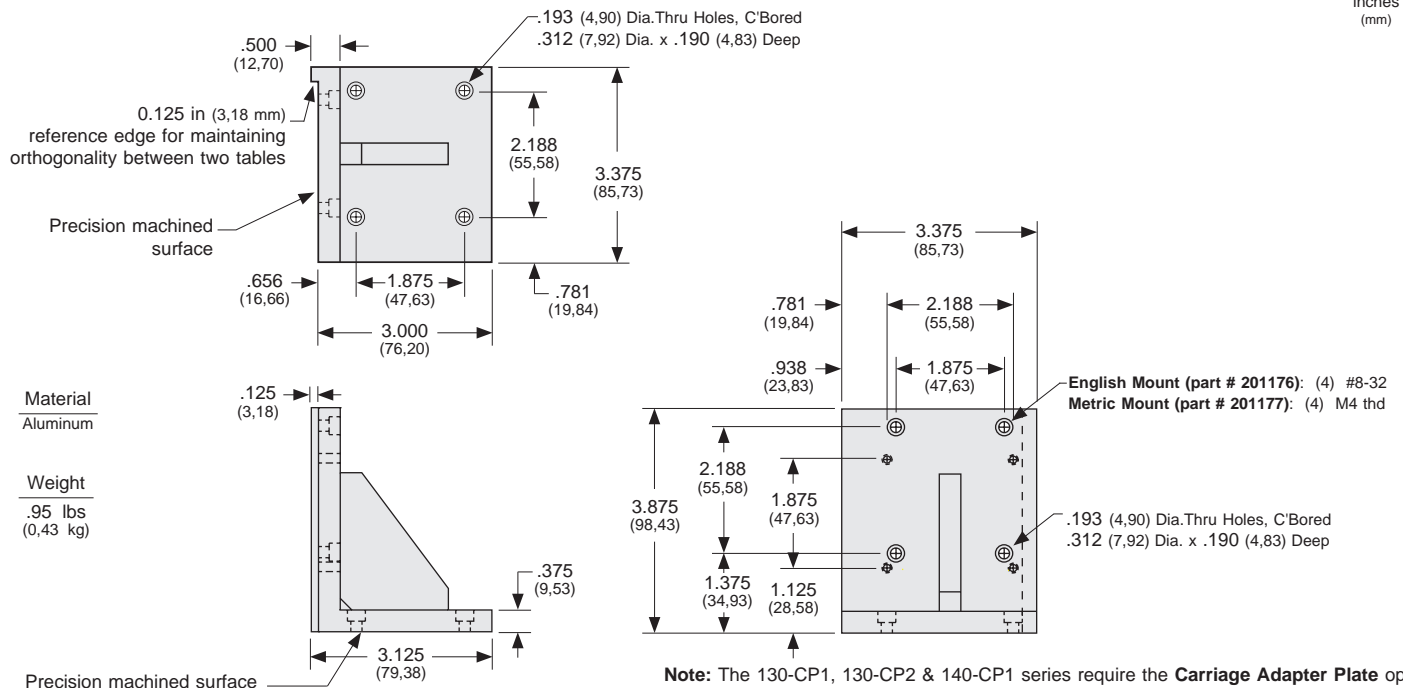
of the angle bracket. The angle bracket hole pattern is pre-engineered for easy mounting of either the table carriage or table base.

When ordered, the angle bracket is shipped separately from the tables. The user is required to assemble the angle bracket to the tables. However, if requested, **LINTECH** can pre-assemble the multiple axis system before shipping. Anytime an angle bracket is used for multiple axis configurations, moment loads will result on one or more axes. Be sure to review moment loads, and the positioning table life, for your application.

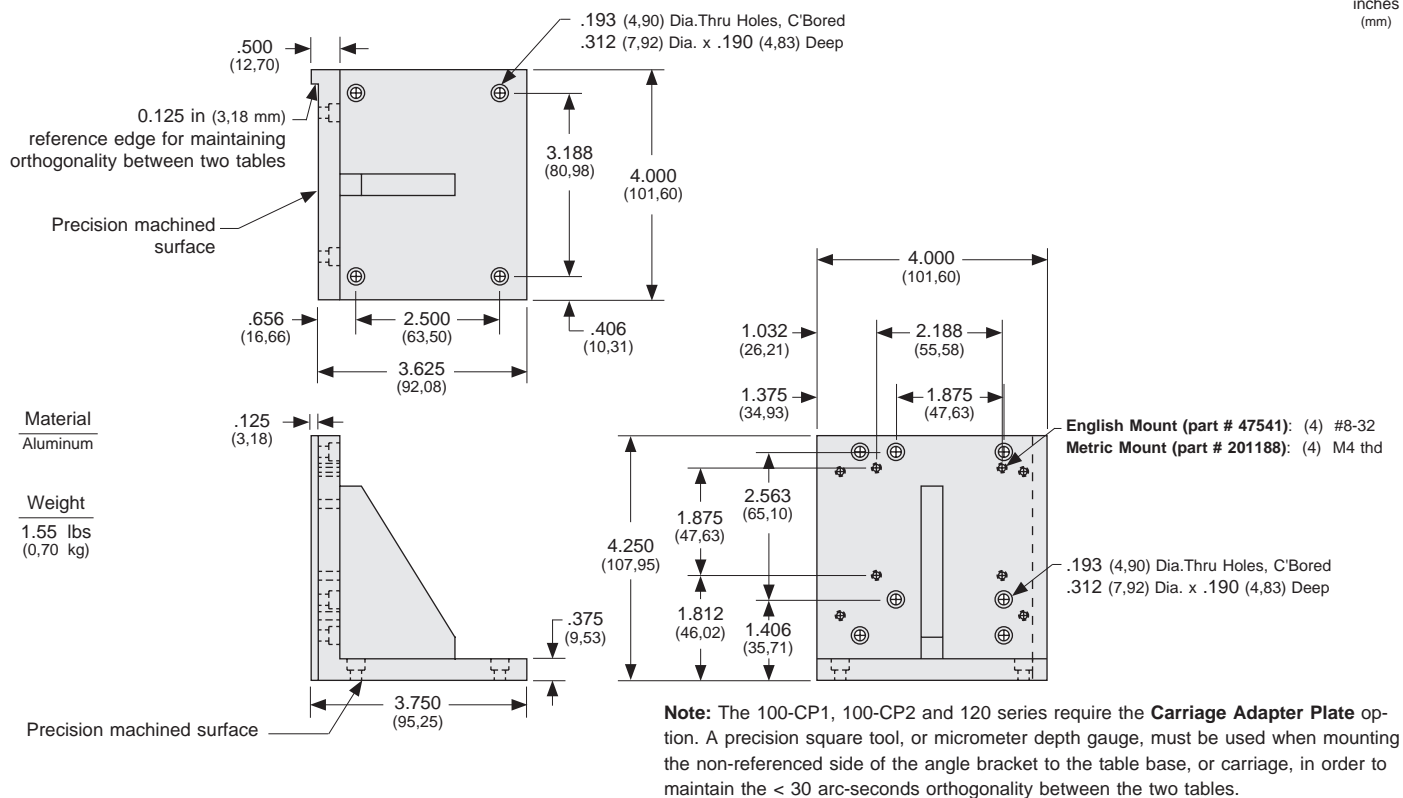
Either the 130 or 140 series base or carriage can be mounted to either vertical angle bracket.



Vertical Angle Bracket (130 or 140 series to 130 or 140 series)

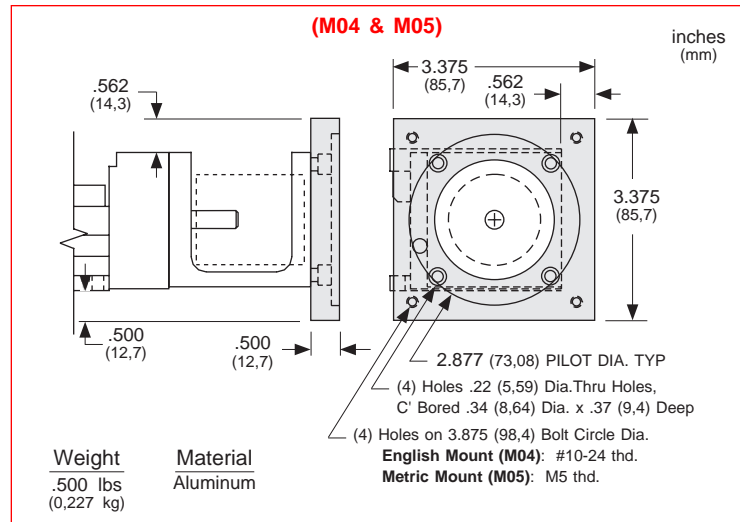
inches
(mm)

Vertical Angle Bracket (130 or 140 series to 100 series)

inches
(mm)

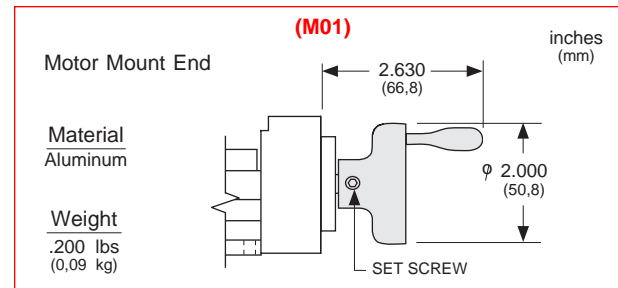
NEMA 34 Motor Mount for 130 Series

The NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount. The bracket can be ordered in either an English, or Metric motor mount. **LINTECH** can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



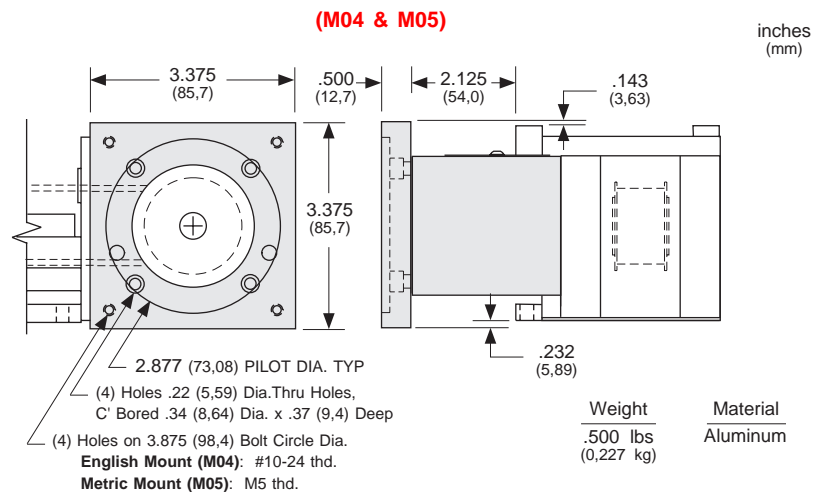
Hand Crank

For manually operated applications, **LINTECH** provides a hand crank option for the 130 table series. The hand crank replaces the motor mount and coupling on the table.



NEMA 34 Motor Mount for 140 Series

The 140 series positioning table can be provided with an optional NEMA 34 motor adapter bracket. The bracket can be ordered in either an English, or Metric motor mount. **LINTECH** can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



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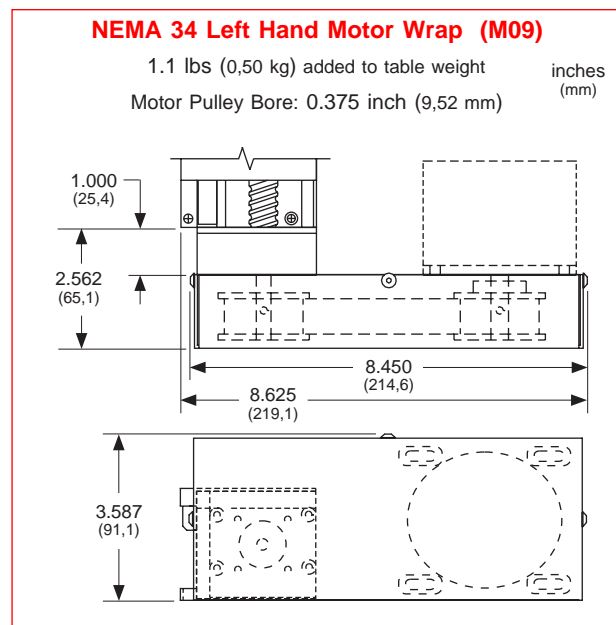
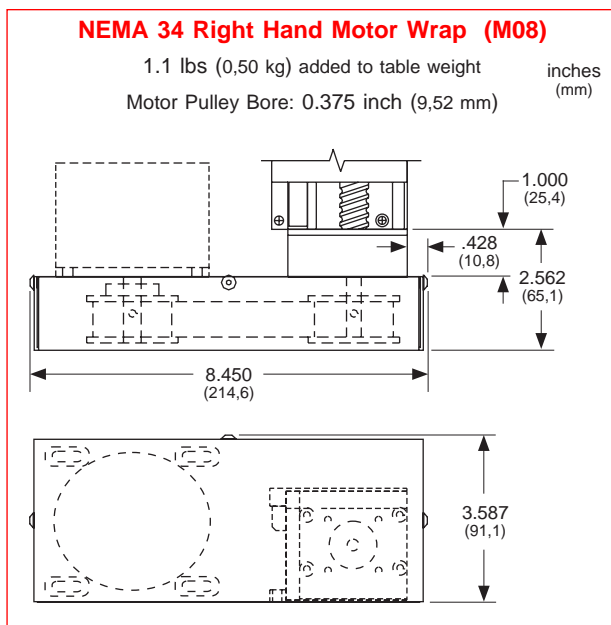
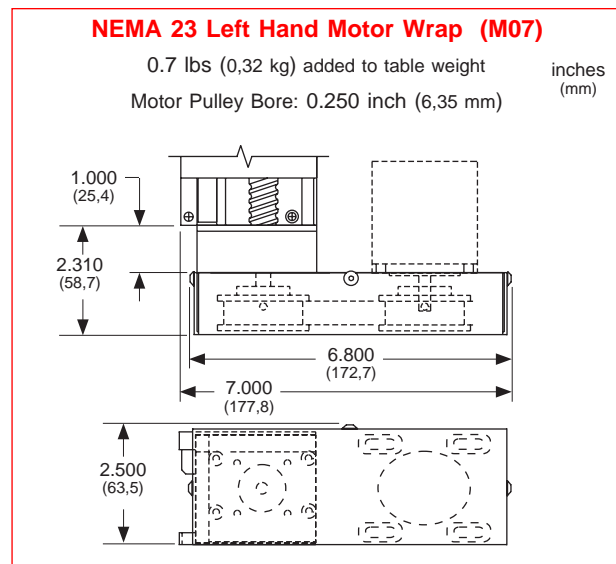
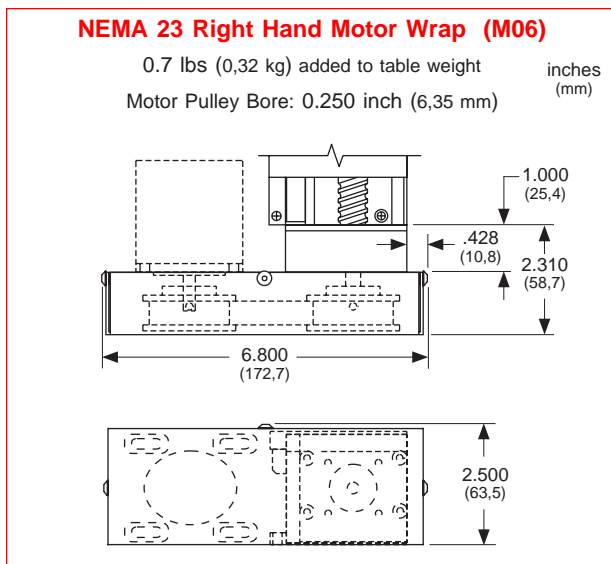
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Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages

For space limited 130 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 23	1.65 (41,9)	7.5 (0,21)	1.65 (41,9)	7.5 (0,21)	1.0 (0,028)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)

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Note: Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores MUST be specified for non-NEMA motors.

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Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 130 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. The 140 series will have the brake mounted to the thru drive shaft option. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. **LINTECH** also provides 24 & 90 VDC power supplies which can be used to power the brakes.

Brakes

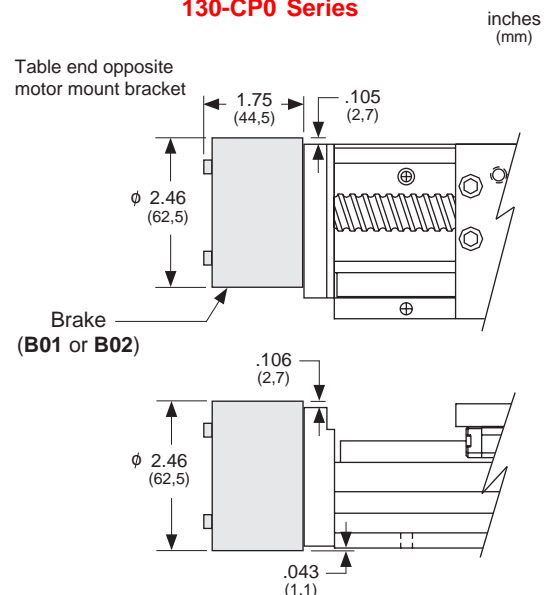
Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

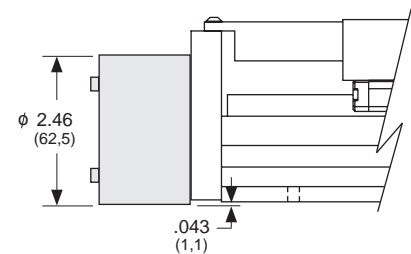
Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60

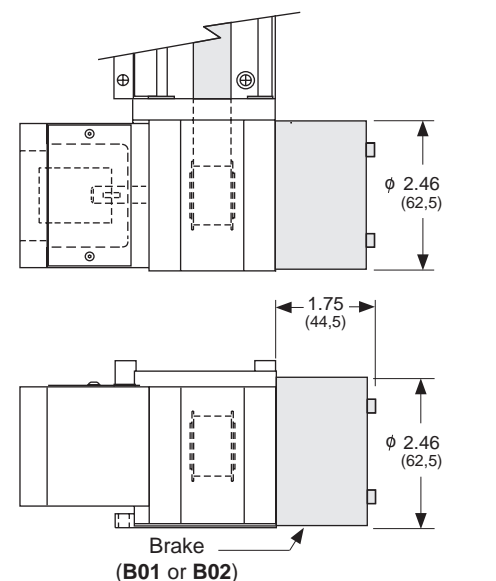
130-CP0 Series



130-CP1 or 130-CP2 Series



140 Series



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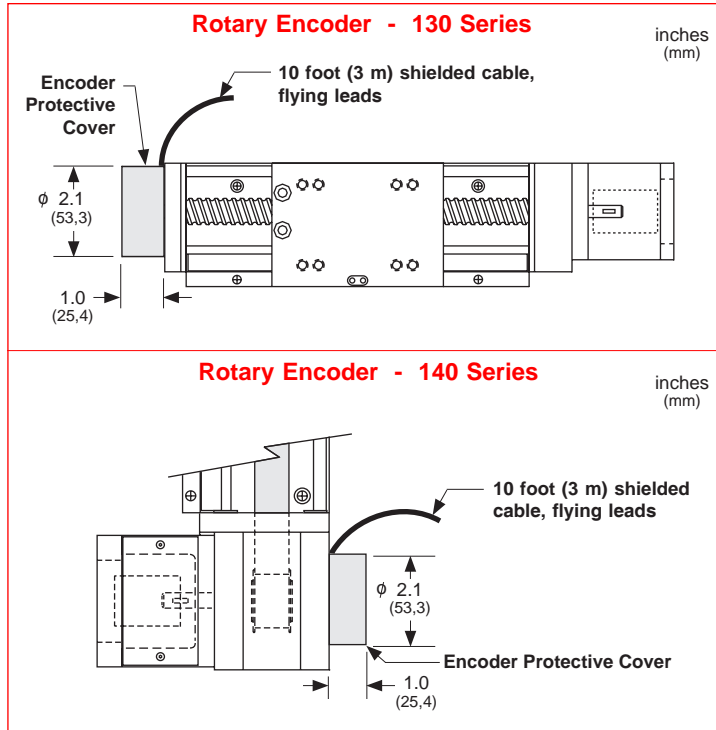
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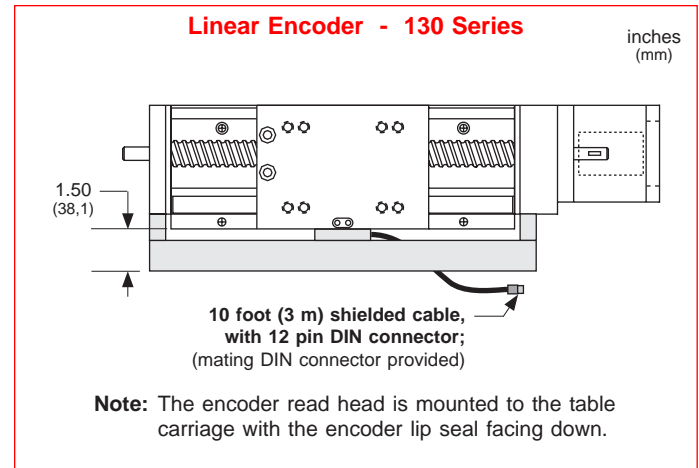
Specifications Subject to Change Without Notice

Linear & Rotary Incremental Encoders

Fully enclosed, incremental, optical linear encoders can be mounted on the side of any **LINTECH** 130 series. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension on the opposite end from the motor mount end on the 130 or 140 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.



LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

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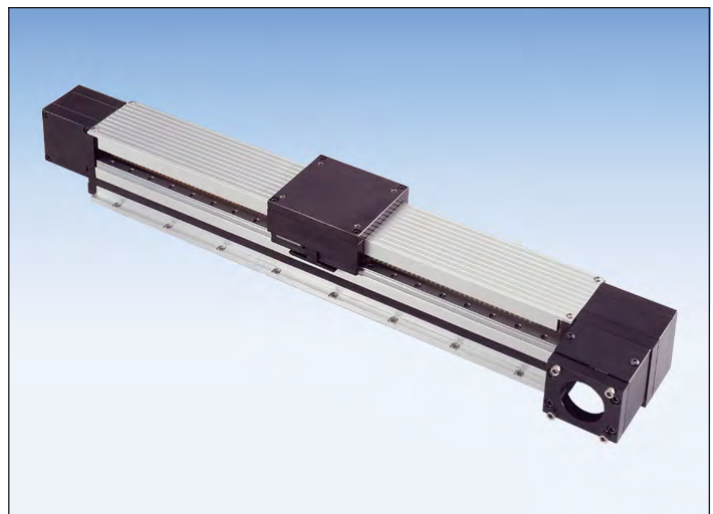
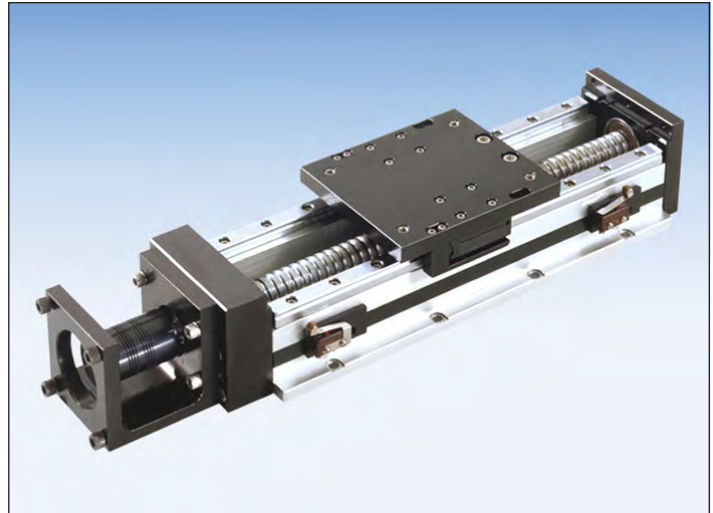
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100, 110, & 120 Series Positioning Tables

100 Series Specifications _____	C-5
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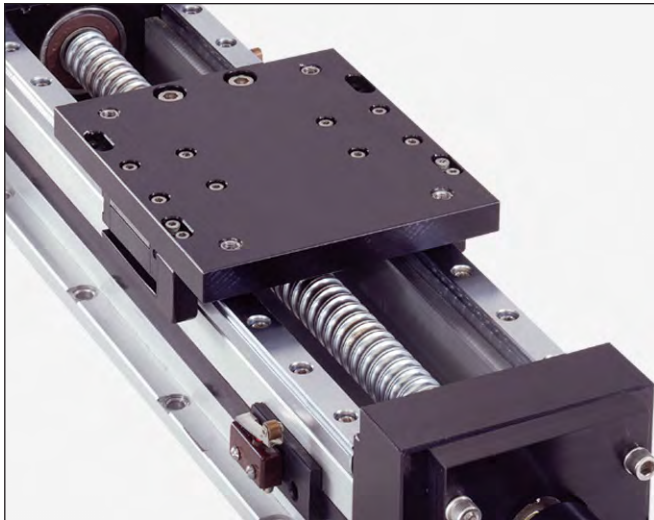
Single or Multiple Axis

LINTECH's 100 & 110 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- Welding
- Test Stands
- Part Insertion
- Laser Positioning
- Liquid Dispensing
- Semiconductor Processing
- Gluing
- Pick & Place
- Part Scanning
- Inspection Stations
- General Automation

Quality Construction

LINTECH's 100 & 110 series tables are designed to maximize performance while minimizing physical size and cost. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 30 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 100 & 110 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various LINTECH positioning tables, thus providing for easy multiple axis configurations.

Cover Plates and Waycovers

For harsh environmental conditions, or for operator protection, these tables can be fitted with either aluminum cover plates, or a waycover. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 100 & 110 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 100 & 110 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

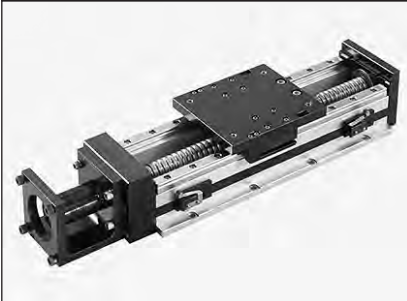
Other

The 100 & 110 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

Standard Features - 100 & 110 Series

- Compact 3.50 inches (89 mm) wide by 2.375 inches (60 mm) tall - 100 series
- Compact 5.25 inches (133 mm) wide by 2.375 inches (60 mm) tall - 110 series
- Travel lengths from 2 inches (50 mm) to 60 inches (1520 mm)
- Threaded stainless steel inserts in carriage for load mounting
- 0° F to +185° F (-18° C to +85° C) operating temperature
- Recirculating linear ball bearing system
- Precision ground square rail design
- 2 rails, 2 or 4 bearing carriages

100-CP0 Series



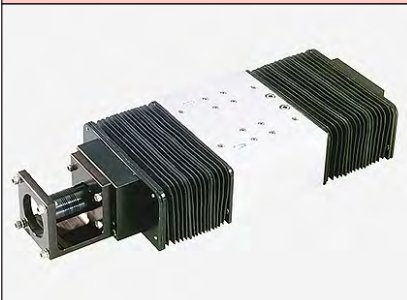
100-CP1 Series



100-CP2 Series



110-WC1 Series



Options - 100 & 110 Series

- Chrome plated linear bearings, rails and screws
- End of travel (EOT) and home switches wired
- CAD drawings available via the internet
- Adapter brackets for non-NEMA motors
- Linear and rotary incremental encoders
- NEMA 23 & 34 motor wrap packages
- NEMA 34 adapter bracket
- Power-off electric brakes
- Carriage adapter plates
- Vertical angle bracket
- Turcite nut option
- Motor couplings
- Cover plates
- Waycovers
- Hand crank

- Ball screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- * 0.500 inch diameter, 0.500 inch lead
- 0.625 inch diameter, 1.000 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- * 16 mm diameter, 10 mm lead
- * 16 mm diameter, 16 mm lead

Ground - Preloaded Nuts Only:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 16 mm lead

* (Reduction of travel with preloaded nut)

- Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.100 inch lead
- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 4 mm lead

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10 - **4** - **4** - **02** - **CP0** - **1** - **S114** - **M02** - **C145** - **L01** - **E00** - **B00**

Table Series

Number of Bearings

- 2** - 2 bearing per carriage
- 4** - 4 bearings per carriage

Carriage Length

- 4** - 4 inches

Travel Length (see pages C-6, C-8 & C-10)

- 02** - 2 to 60 inches

Cover Plate

- CP0** - no cover plates
- CP1** - top cover plate only
- CP2** - top & side cover plates

Carriage Inserts (see pages C-7, C-9 & C-11)

- 1** - English mount
- 2** - Metric mount

Screw Options (see pages C-18 to C-23)

<i>Rolled ball screws</i>	<i>Precision ball screws</i>	<i>Ground ball screws</i>
S001 - .500 x .500 NPL	S114 - .625 x .200 NPL	S212 - .625 x .200 PL
S002 - .500 x .500 PL	S115 - .625 x .200 PL	S213 - .625 x .500 PL
S003 - .500 x .500 NPL(T)	S116 - 16 x 5 NPL	S214 - 16 x 5 PL
S004 - .500 x .500 PL(T)	S117 - 16 x 5 PL	S215 - 16 x 16 PL
S005 - .625 x .200 NPL	S118 - 16 x 10 NPL	
S006 - .625 x .200 PL	S119 - 16 x 10 PL	<i>Rolled acme screws</i>
S007 - .625 x .200 NPL(T)	S120 - 16 x 16 NPL	S300 - .625 x .100 NPL
S008 - .625 x .200 PL(T)	S121 - 16 x 16 PL	S301 - .625 x .100 PL
S009 - .625 x 1.000 NPL		S302 - .625 x .200 NPL
S010 - .625 x 1.000 PL		S303 - .625 x .200 PL
S011 - .625 x 1.000 NPL(T)		S304 - 16 x 4 NPL
S012 - .625 x 1.000 PL(T)	S999 - other	S305 - 16 x 4 PL

Motor Mount (see pages C-7, C-9, C-11, C-46 & C-47)

- M00** - none
- M01** - hand crank
- M99** - other
- M02** - NEMA 23 mount (E)
- M03** - NEMA 23 mount (M)
- M04** - NEMA 34 mount (E)
- M05** - NEMA 34 mount (M)
- M06** - NEMA 23 (RH) wrap
- M07** - NEMA 23 (LH) wrap
- M08** - NEMA 34 (RH) wrap
- M09** - NEMA 34 (LH) wrap

Coupling Options (see pages C-40 to C-41)

- C000** - none
- C999** - other
- C020 to C024** - C100
- C040 to C047** - C125
- C125 to C129** - H100
- C145 to C154** - H131
- C400 to C406** - G100
- C425 to C434** - G126

Limit & Home Switches (see pages C-37 to C-39)

- L00** - no switches
- L99** - other
- EOT & home switches
- EOT switches only
- home switch only
- Mechanical**
- Reed**
- Hall**
- Prox (NPN)**
- Prox (PNP)**
- L01**
- L02**
- L03**
- L04**
- L05**
- L06**
- L07**
- L08**
- L09**
- L10**
- L11**
- L12**
- L13**
- L14**
- L15**

Encoder Options (see page C-49)

- E00** - none
- E01** - rotary (500 lines/rev)
- E02** - rotary (1000 lines/rev)
- E03** - rotary (1270 lines/rev)
- E10** - linear (2500 lines/inch)
- E11** - linear (125 lines/mm)
- E99** - other

Power-off Brakes (see page C-48)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other

- (E) - English Interface
- (LH) - Left Hand
- (M) - Metric Interface
- (NPL) - Non Preloaded
- (PL) - Preloaded
- (RH) - Right Hand
- (T) - Turcite Nut

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	1,550 lbs	(703 kg)	3,100 lbs	(1406 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	525 lbs	(238 kg)	1,060 lbs	(480 kg)
Static Horizontal		2,360 lbs	(1070 kg)	4,720 lbs	(2140 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	140 ft-lbs	(190 N-m)	280 ft-lbs	(379 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	47 ft-lbs	(64 N-m)	95 ft-lbs	(129 N-m)
Static Roll Moment		210 ft-lbs	(285 N-m)	425 ft-lbs	(576 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	18 ft-lbs	(24 N-m)	240 ft-lbs	(325 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	6 ft-lbs	(8 N-m)	82 ft-lbs	(111 N-m)
Static Pitch & Yaw Moment		30 ft-lbs	(41 N-m)	365 ft-lbs	(495 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	775 lbs	(351 kg)	775 lbs	(351 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	263 lbs	(119 kg)	263 lbs	(119 kg)
Each Bearing Static Load Capacity		1,180 lbs	(535 kg)	1,180 lbs	(535 kg)
Thrust Force Capacity	10 million screw revolutions	665 lbs	(302 kg)	665 lbs	(302 kg)
Thrust Force Capacity	500 million screw revolutions	180 lbs	(82 kg)	180 lbs	(82 kg)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	2.375 in	(60,3 mm)	2.375 in	(60,3 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	-		2.088 in	(53,0 mm)
d_r	CP0 version Center distance of the bearing to top of carriage plate surface	.750 in	(19,1 mm)	.750 in	(19,1 mm)
d_r	CP1 version Center distance of the bearing to top of carriage plate surface	1.375 in	(34,9 mm)	1.375 in	(34,9 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Stainless Steel
Screw Material (see pages C-18 to C-23)	Acme Screw - Stainless Steel
Screw Material (see pages C-18 to C-23)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	<0.00013 in/in (< 3,30 microns/25mm)
Flatness	<0.00013 in/in (< 3,30 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table (1) Weight lbs (kg)
		A	B	C	D	E	M		
10x402-CP0	2 (50)	6.0 (152,4)	9.875 (250,8)	0.500 (12,7)	1.250 (31,7)	1	8	9.25 (235)	5.1 (2,3)
10x404-CP0	4 (100)	8.0 (203,2)	11.875 (301,6)	0.250 (6,3)	2.500 (63,5)	1	8	11.25 (286)	5.9 (2,7)
10x406-CP0	6 (150)	10.0 (254,0)	13.875 (352,4)	1.250 (31,7)	2.500 (63,5)	1	8	13.25 (337)	6.7 (3,0)
10x408-CP0	8 (200)	12.0 (304,8)	15.875 (403,2)	0.250 (6,3)	2.000 (50,8)	3	12	15.25 (387)	7.5 (3,4)
10x412-CP0	12 (300)	16.0 (406,4)	19.875 (504,8)	0.250 (6,3)	1.500 (38,1)	5	16	19.25 (489)	9.1 (4,1)
10x416-CP0	16 (405)	20.0 (508,0)	23.875 (606,4)	1.250 (31,7)	2.500 (63,5)	5	16	23.25 (591)	10.7 (4,8)
10x420-CP0	20 (505)	24.0 (609,6)	27.875 (708,0)	0.750 (19,0)	2.500 (63,5)	7	20	27.25 (692)	12.3 (5,6)
10x424-CP0	24 (605)	28.0 (711,2)	31.875 (809,6)	0.250 (6,3)	2.500 (63,5)	9	24	31.25 (794)	13.9 (6,3)
10x430-CP0	30 (760)	34.0 (863,6)	37.875 (962,0)	0.750 (19,0)	2.500 (63,5)	11	28	37.25 (946)	16.3 (7,4)
10x436-CP0	36 (910)	40.0 (1016,0)	43.875 (1114,4)	1.250 (31,7)	2.500 (63,5)	13	32	43.25 (1099)	18.7 (8,5)
10x442-CP0	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.750 (44,4)	2.500 (63,5)	15	36	49.25 (1251)	21.1 (9,6)
10x448-CP0	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	2.250 (57,1)	2.500 (63,5)	17	40	55.25 (1403)	23.5 (10,6)
10x454-CP0	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	0.250 (6,3)	2.500 (63,5)	21	48	61.25 (1556)	25.9 (11,4)
10x460-CP0	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	0.750 (19,0)	2.500 (63,5)	23	52	67.25 (1708)	28.3 (12,8)

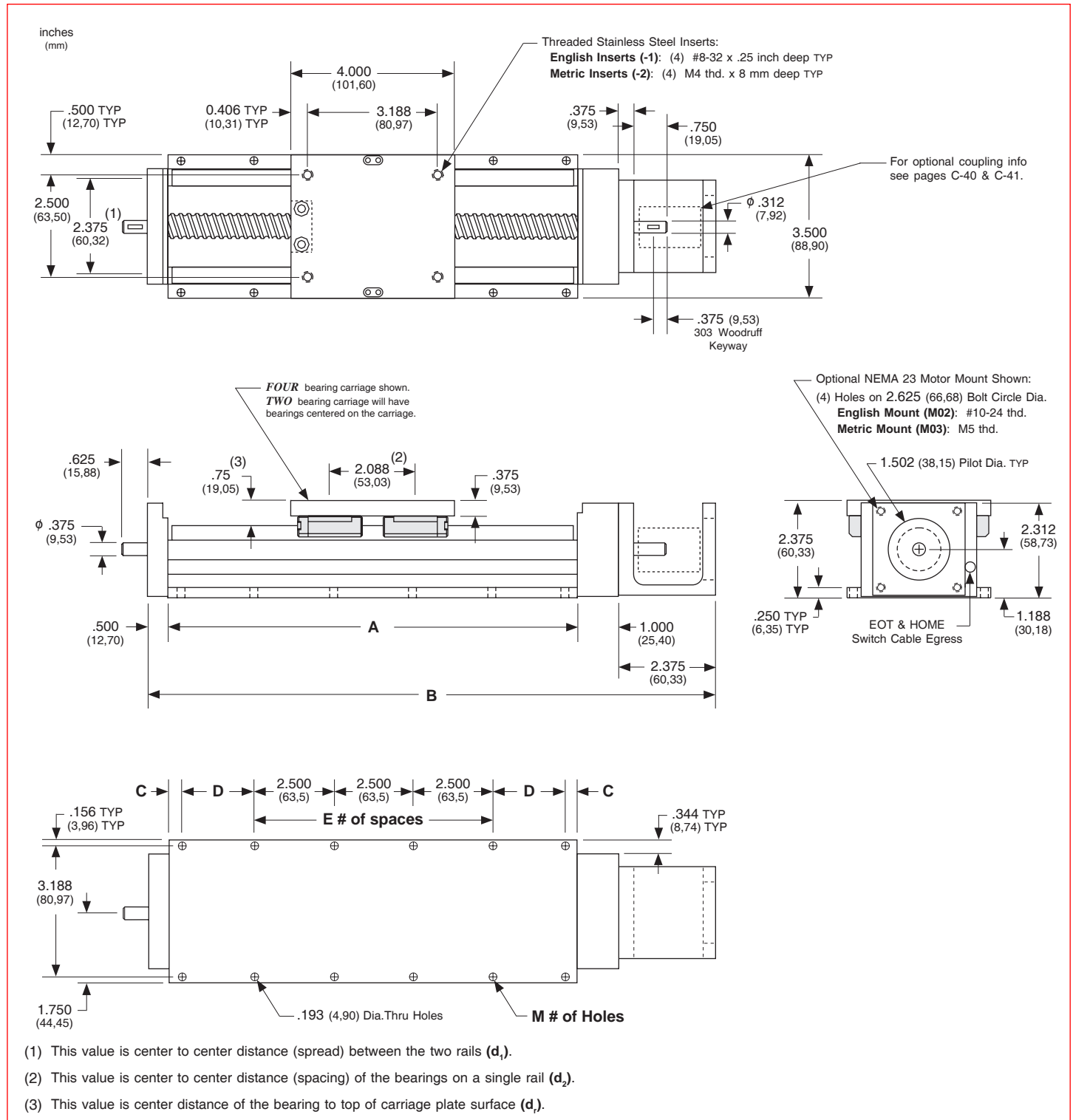
- x = 2; Carriage has 2 bearings; Carriage weight = 1.2 lbs. (0,54 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 1.4 lbs. (0,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 2 bearing carriage [1.2 lbs (0,54 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- Without Cover Plates -



- (1) This value is center to center distance (spread) between the two rails (d_1).
- (2) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (3) This value is center distance of the bearing to top of carriage plate surface (d_3).

Note: Any 100, 110, 120 or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table (1) Weight lbs (kg)
		A	B	C	D	E	M		
10x402-CP1	2 (50)	6.0 (152,4)	9.875 (250,8)	0.500 (12,7)	1.250 (31,7)	1	8	9.25 (235)	6.1 (2,8)
10x404-CP1	4 (100)	8.0 (203,2)	11.875 (301,6)	0.250 (6,3)	2.500 (63,5)	1	8	11.25 (286)	7.0 (3,2)
10x406-CP1	6 (150)	10.0 (254,0)	13.875 (352,4)	1.250 (31,7)	2.500 (63,5)	1	8	13.25 (337)	7.9 (3,6)
10x408-CP1	8 (200)	12.0 (304,8)	15.875 (403,2)	0.250 (6,3)	2.000 (50,8)	3	12	15.25 (387)	8.8 (4,0)
10x412-CP1	12 (300)	16.0 (406,4)	19.875 (504,8)	0.250 (6,3)	1.500 (38,1)	5	16	19.25 (489)	10.6 (4,8)
10x416-CP1	16 (405)	20.0 (508,0)	23.875 (606,4)	1.250 (31,7)	2.500 (63,5)	5	16	23.25 (591)	12.3 (5,6)
10x420-CP1	20 (505)	24.0 (609,6)	27.875 (708,0)	0.750 (19,0)	2.500 (63,5)	7	20	27.25 (692)	14.0 (6,3)
10x424-CP1	24 (605)	28.0 (711,2)	31.875 (809,6)	0.250 (6,3)	2.500 (63,5)	9	24	31.25 (794)	15.9 (7,2)
10x430-CP1	30 (760)	34.0 (863,6)	37.875 (962,0)	0.750 (19,0)	2.500 (63,5)	11	28	37.25 (946)	18.6 (8,4)
10x436-CP1	36 (910)	40.0 (1016,0)	43.875 (1114,4)	1.250 (31,7)	2.500 (63,5)	13	32	43.25 (1099)	21.3 (9,7)
10x442-CP1	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.750 (44,4)	2.500 (63,5)	15	36	49.25 (1251)	24.0 (10,9)
10x448-CP1	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	2.250 (57,1)	2.500 (63,5)	17	40	55.25 (1403)	26.7 (12,1)
10x454-CP1	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	0.250 (6,3)	2.500 (63,5)	21	48	61.25 (1556)	29.4 (13,3)
10x460-CP1	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	0.750 (19,0)	2.500 (63,5)	23	52	67.25 (1708)	32.1 (14,6)

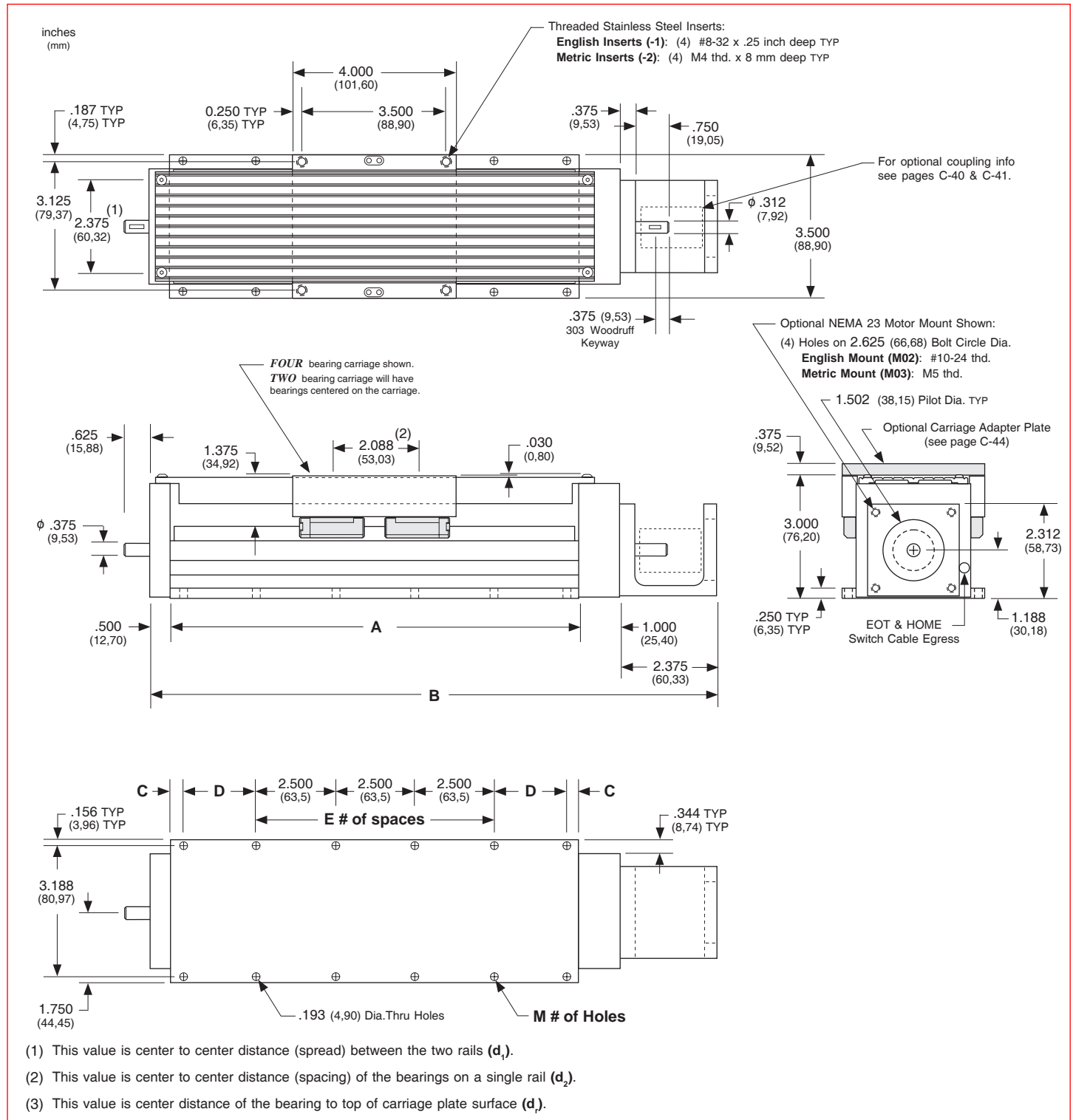
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 1.7 lbs. (0,77 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 2 bearing carriage [1.5 lbs (0,68 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- With Top Cover Plate Only -



Note: Any 100, 110, 120, or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. *LINTECH's* 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table (1) Weight lbs (kg)
		A	B	C	D	E	M		
10x402-CP2	2 (50)	6.0 (152,4)	9.875 (250,8)	0.500 (12,7)	1.250 (31,7)	1	8	9.25 (235)	6.4 (2,9)
10x404-CP2	4 (100)	8.0 (203,2)	11.875 (301,6)	0.250 (6,3)	2.500 (63,5)	1	8	11.25 (286)	7.3 (3,3)
10x406-CP2	6 (150)	10.0 (254,0)	13.875 (352,4)	1.250 (31,7)	2.500 (63,5)	1	8	13.25 (337)	8.3 (3,8)
10x408-CP2	8 (200)	12.0 (304,8)	15.875 (403,2)	0.250 (6,3)	2.000 (50,8)	3	12	15.25 (387)	9.2 (4,2)
10x412-CP2	12 (300)	16.0 (406,4)	19.875 (504,8)	0.250 (6,3)	1.500 (38,1)	5	16	19.25 (489)	11.1 (5,0)
10x416-CP2	16 (405)	20.0 (508,0)	23.875 (606,4)	1.250 (31,7)	2.500 (63,5)	5	16	23.25 (591)	13.0 (5,9)
10x420-CP2	20 (505)	24.0 (609,6)	27.875 (708,0)	0.750 (19,0)	2.500 (63,5)	7	20	27.25 (692)	14.8 (6,7)
10x424-CP2	24 (605)	28.0 (711,2)	31.875 (809,6)	0.250 (6,3)	2.500 (63,5)	9	24	31.25 (794)	16.8 (7,6)
10x430-CP2	30 (760)	34.0 (863,6)	37.875 (962,0)	0.750 (19,0)	2.500 (63,5)	11	28	37.25 (946)	19.6 (8,9)
10x436-CP2	36 (910)	40.0 (1016,0)	43.875 (1114,4)	1.250 (31,7)	2.500 (63,5)	13	32	43.25 (1099)	22.5 (10,2)
10x442-CP2	42 (1060)	46.0 (1168,4)	49.875 (1266,8)	1.750 (44,4)	2.500 (63,5)	15	36	49.25 (1251)	25.4 (11,5)
10x448-CP2	48 (1215)	52.0 (1320,8)	55.875 (1419,2)	2.250 (57,1)	2.500 (63,5)	17	40	55.25 (1403)	28.2 (12,8)
10x454-CP2	54 (1370)	58.0 (1473,2)	61.875 (1571,6)	0.250 (6,3)	2.500 (63,5)	21	48	61.25 (1556)	31.1 (14,1)
10x460-CP2	60 (1520)	64.0 (1625,6)	67.875 (1724,0)	0.750 (19,0)	2.500 (63,5)	23	52	67.25 (1708)	34.0 (15,4)

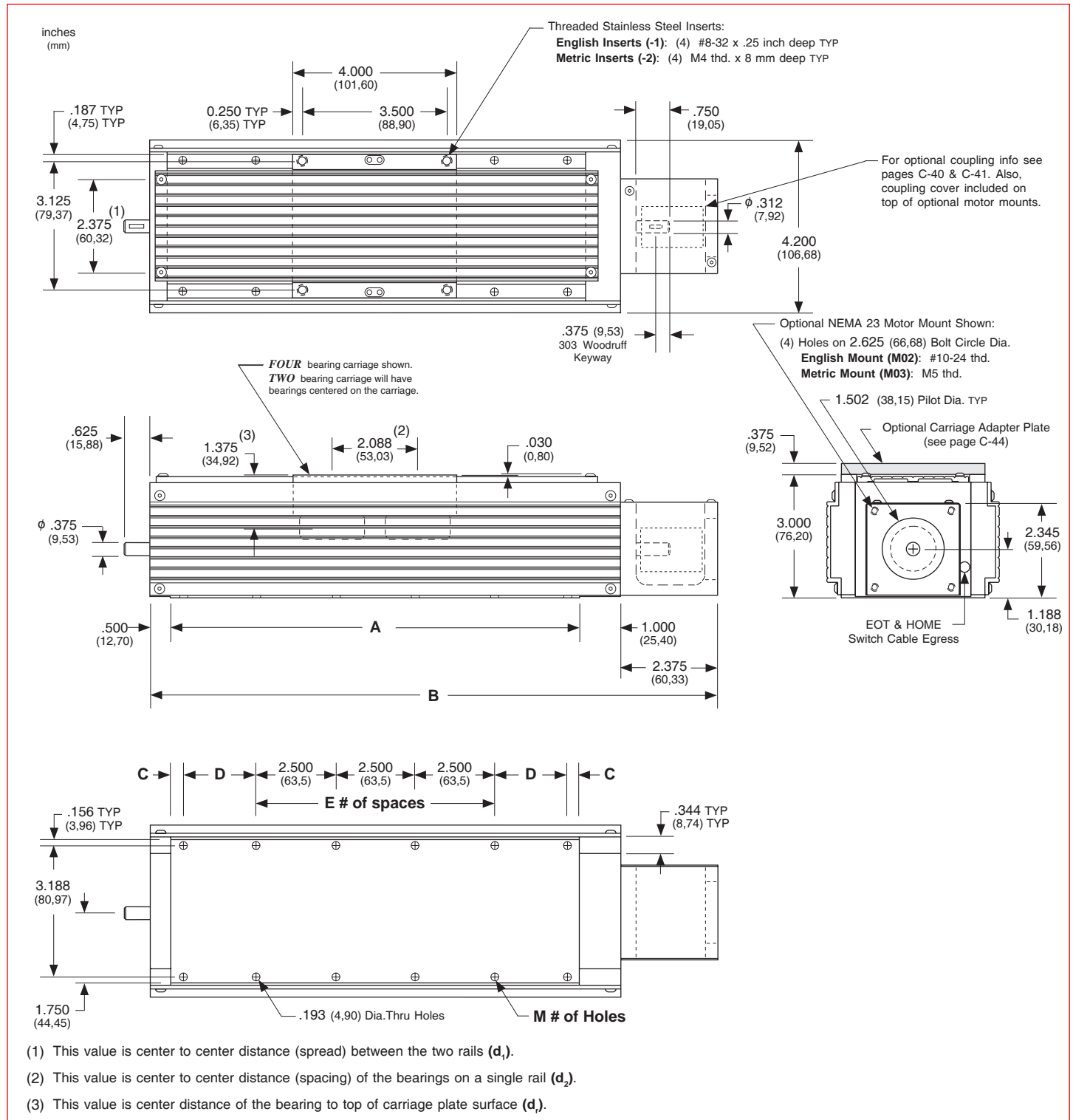
- x = 2; Carriage has 2 bearings; Carriage weight = 1.5 lbs. (0,68 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 1.7 lbs. (0,77 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 2 bearing carriage [1.5 lbs (0,68 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- With Top & Side Cover Plates -



Note: Any 100, 110, 120, or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. *LINTECH's* 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

11 **4** **4** **01** - **WC1** - **1** - **S114** - **M02** - **C145** - **L01** - **E00** - **B00**

Table Series

Number of Bearings

- 2** - 2 bearing per carriage
- 4** - 4 bearings per carriage

Carriage Length

- 4** - 4 inches

Travel Length (see page C-14)

- 01** - 1 to 45 inches

Waycovers

- WC1** - with waycovers

Carriage Inserts (see pages C-15)

- 1** - English mount
- 2** - Metric mount

Screw Options (see pages C-18 to C-23)

Rolled ball screws

- S001** - .500 x .500 NPL
- S002** - .500 x .500 PL
- S003** - .500 x .500 NPL(T)
- S004** - .500 x .500 PL(T)
- S005** - .625 x .200 NPL
- S006** - .625 x .200 PL
- S007** - .625 x .200 NPL(T)
- S008** - .625 x .200 PL(T)
- S009** - .625 x 1.000 NPL
- S010** - .625 x 1.000 PL
- S011** - .625 x 1.000 NPL(T)
- S012** - .625 x 1.000 PL(T)

Precision ball screws

- S114** - .625 x .200 NPL
- S115** - .625 x .200 PL
- S116** - 16 x 5 NPL
- S117** - 16 x 5 PL
- S118** - 16 x 10 NPL
- S119** - 16 x 10 PL
- S120** - 16 x 16 NPL
- S121** - 16 x 16 PL
- S999** - other

Ground ball screws

- S212** - .625 x .200 PL
- S213** - .625 x .500 PL
- S214** - 16 x 5 PL
- S215** - 16 x 16 PL

Rolled acme screws

- S300** - .625 x .100 NPL
- S301** - .625 x .100 PL
- S302** - .625 x .200 NPL
- S303** - .625 x .200 PL
- S304** - 16 x 4 NPL
- S305** - 16 x 4 PL

Motor Mount (see pages C-15, C-46 & C-47)

- M00** - none
- M01** - hand crank
- M99** - other
- M02** - NEMA 23 mount (E)
- M03** - NEMA 23 mount (M)
- M04** - NEMA 34 mount (E)
- M05** - NEMA 34 mount (M)
- M06** - NEMA 23 (RH) wrap
- M07** - NEMA 23 (LH) wrap
- M08** - NEMA 34 (RH) wrap
- M09** - NEMA 34 (LH) wrap

Coupling Options (see pages C-40 to C-41)

- C000** - none
- C999** - other
- C020 to C024** - C100
- C040 to C047** - C125
- C125 to C129** - H100
- C145 to C154** - H131
- C400 to C406** - G100
- C425 to C434** - G126

Limit & Home Switches (see pages C-37 to C-39)

- | | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|------------|
| L00 - no switches | | Mechanical | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L01 | L04 | L07 | L10 | L13 |
| | EOT switches only | L02 | L05 | L08 | L11 | L14 |
| | home switch only | L03 | L06 | L09 | L12 | L15 |

Encoder Options (see page C-49)

- E00** - none
- E01** - rotary (500 lines/rev)
- E02** - rotary (1000 lines/rev)
- E03** - rotary (1270 lines/rev)
- E10** - linear (2500 lines/inch)
- E11** - linear (250 lines/mm)
- E99** - other

Power-off Brakes (see page C-48)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other

- (E) - English Interface
- (LH) - Left Hand
- (M) - Metric Interface
- (NPL) - Non Preloaded
- (PL) - Preloaded
- (RH) - Right Hand
- (T) - Turcite Nut

Sold & Serviced By:



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Toll Free Fax (877) SERV099

www.electromate.com

sales@electromate.com

Specifications Subject to Change Without Notice

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	1,550 lbs	(703 kg)	3,100 lbs	(1406 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	525 lbs	(238 kg)	1,060 lbs	(480 kg)
Static Horizontal		2,360 lbs	(1070 kg)	4,720 lbs	(2140 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	140 ft-lbs	(190 N-m)	280 ft-lbs	(379 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	47 ft-lbs	(64 N-m)	95 ft-lbs	(129 N-m)
Static Roll Moment		210 ft-lbs	(285 N-m)	425 ft-lbs	(576 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	18 ft-lbs	(24 N-m)	240 ft-lbs	(325 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	6 ft-lbs	(8 N-m)	82 ft-lbs	(111 N-m)
Static Pitch & Yaw Moment		30 ft-lbs	(41 N-m)	365 ft-lbs	(495 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	775 lbs	(351 kg)	775 lbs	(351 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	263 lbs	(119 kg)	263 lbs	(119 kg)
Each Bearing Static Load Capacity		1,180 lbs	(535 kg)	1,180 lbs	(535 kg)
Thrust Force Capacity	10 million screw revolutions	665 lbs	(302 kg)	665 lbs	(302 kg)
Thrust Force Capacity	500 million screw revolutions	180 lbs	(82 kg)	180 lbs	(82 kg)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	2.375 in	(60,3 mm)	2.375 in	(60,3 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	-		2.088 in	(53,0 mm)
d_r	Center distance of the bearing to top of carriage plate surface	.750 in	(19,1 mm)	.750 in	(19,1 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Stainless Steel
Screw Material (see pages C-18 to C-23)	Acme Screw - Stainless Steel
Screw Material (see pages C-18 to C-23)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	<0.00013 in/in (< 3,30 microns/25mm)
Flatness	<0.00013 in/in (< 3,30 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows firmly mounted to carriage & end plates

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	E	M		
11x401-WC1	1.000 (25)	6.250 (158,7)	9.875 (250,8)	0.500 (12,7)	1.250 (31,7)	1	8	9.25 (235)	6.3 (2,9)
11x402-WC1	2.500 (63)	8.250 (203,2)	11.875 (301,6)	0.250 (6,3)	2.500 (63,5)	1	8	11.25 (286)	7.3 (3,3)
11x404-WC1	4.000 (100)	10.250 (260,3)	13.875 (352,4)	1.250 (31,7)	2.500 (63,5)	1	8	13.25 (337)	8.2 (3,7)
11x405-WC1	5.500 (139)	12.250 (311,1)	15.875 (403,2)	0.250 (6,3)	2.000 (50,8)	3	12	15.25 (387)	9.2 (4,2)
11x408-WC1	8.500 (215)	16.250 (412,7)	19.875 (504,8)	0.250 (6,3)	1.500 (38,1)	5	16	19.25 (489)	11.1 (5,0)
11x411-WC1	11.500 (292)	20.250 (514,3)	23.875 (606,4)	1.250 (31,7)	2.500 (63,5)	5	16	23.25 (591)	13.0 (5,9)
11x414-WC1	14.375 (365)	24.250 (615,9)	27.875 (708,0)	0.750 (19,0)	2.500 (63,5)	7	20	27.25 (692)	14.9 (6,8)
11x417-WC1	17.375 (441)	28.250 (717,5)	31.875 (809,6)	0.250 (6,3)	2.500 (63,5)	9	24	31.25 (794)	16.9 (7,7)
11x422-WC1	22.000 (558)	34.250 (869,9)	37.875 (962,0)	0.750 (19,0)	2.500 (63,5)	11	28	37.25 (946)	19.8 (9,0)
11x428-WC1	28.000 (711)	40.250 (1022,3)	43.875 (1114,4)	1.250 (31,7)	2.500 (63,5)	13	32	43.25 (1099)	22.6 (10,2)
11x431-WC1	31.750 (806)	46.250 (1174,7)	49.875 (1266,8)	1.750 (44,4)	2.500 (63,5)	15	36	49.25 (1251)	25.5 (11,6)
11x436-WC1	36.375 (923)	52.250 (1327,1)	55.875 (1419,2)	2.250 (57,1)	2.500 (63,5)	17	40	55.25 (1403)	28.4 (12,9)
11x440-WC1	40.750 (1035)	58.250 (1479,5)	61.875 (1571,6)	0.250 (6,3)	2.500 (63,5)	21	48	61.25 (1556)	31.3 (14,2)
11x445-WC1	45.500 (1155)	64.250 (1631,9)	67.875 (1724,0)	0.750 (19,0)	2.500 (63,5)	23	52	67.25 (1708)	34.1 (15,5)

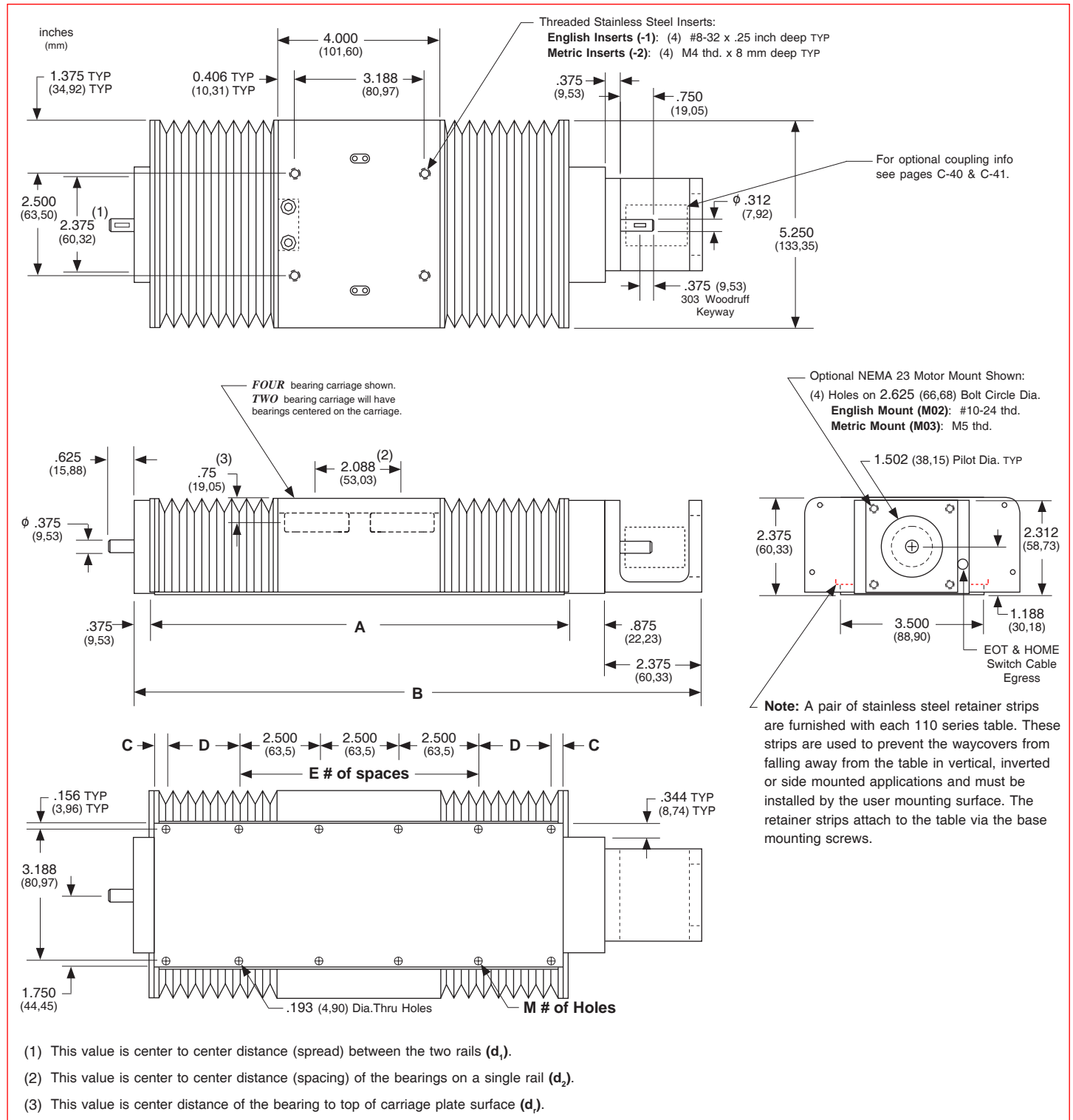
- x = 2; Carriage has 2 bearings; Carriage weight = 1.8 lbs. (0,82 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 2.0 lbs. (0,91 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a 2 bearing carriage [1.8 lbs (0,82 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.500 inch diameter screw subtract 0.022 lbs per inch (0,00039 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- With Waycovers -



Note: Any 100, 110, 120 or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. **LINTECH's** 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page C-17 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

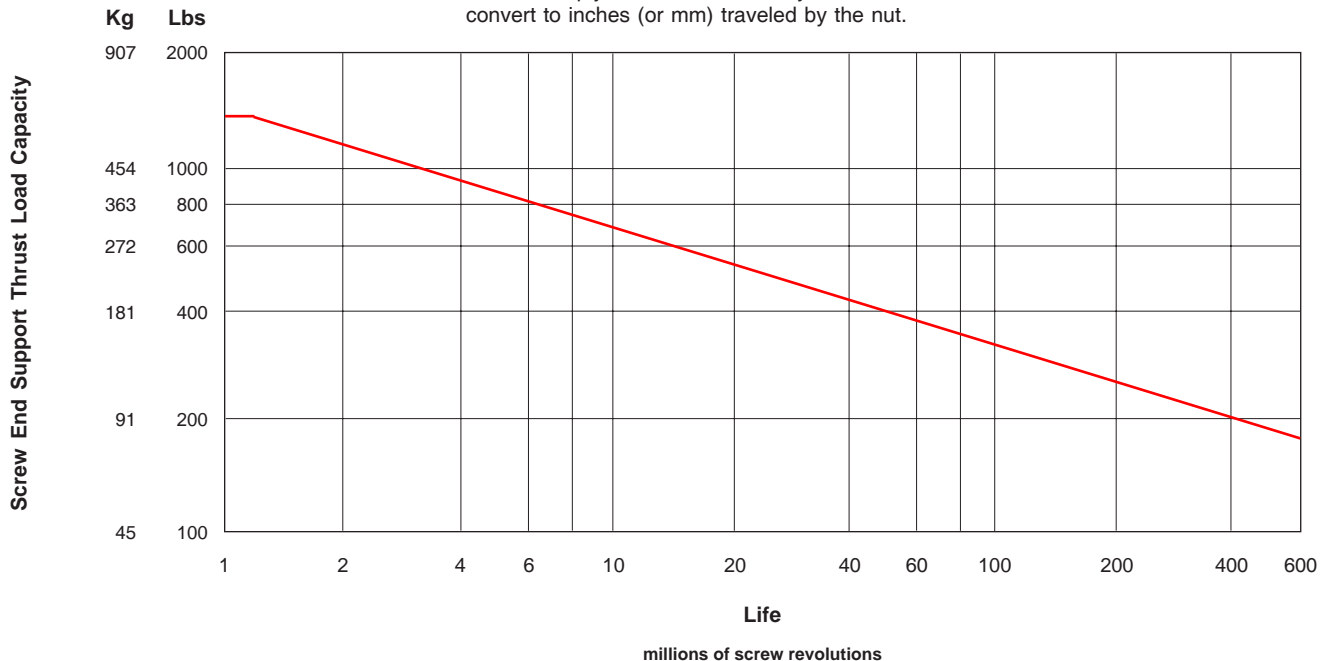
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	1,355 (615)	1,355 (615)	1,145 (519)	665 (302)	395 (179)	305 (138)	180 (82)

Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page C-16 for load/life capacity of the screw end support bearings.

Horizontal Application

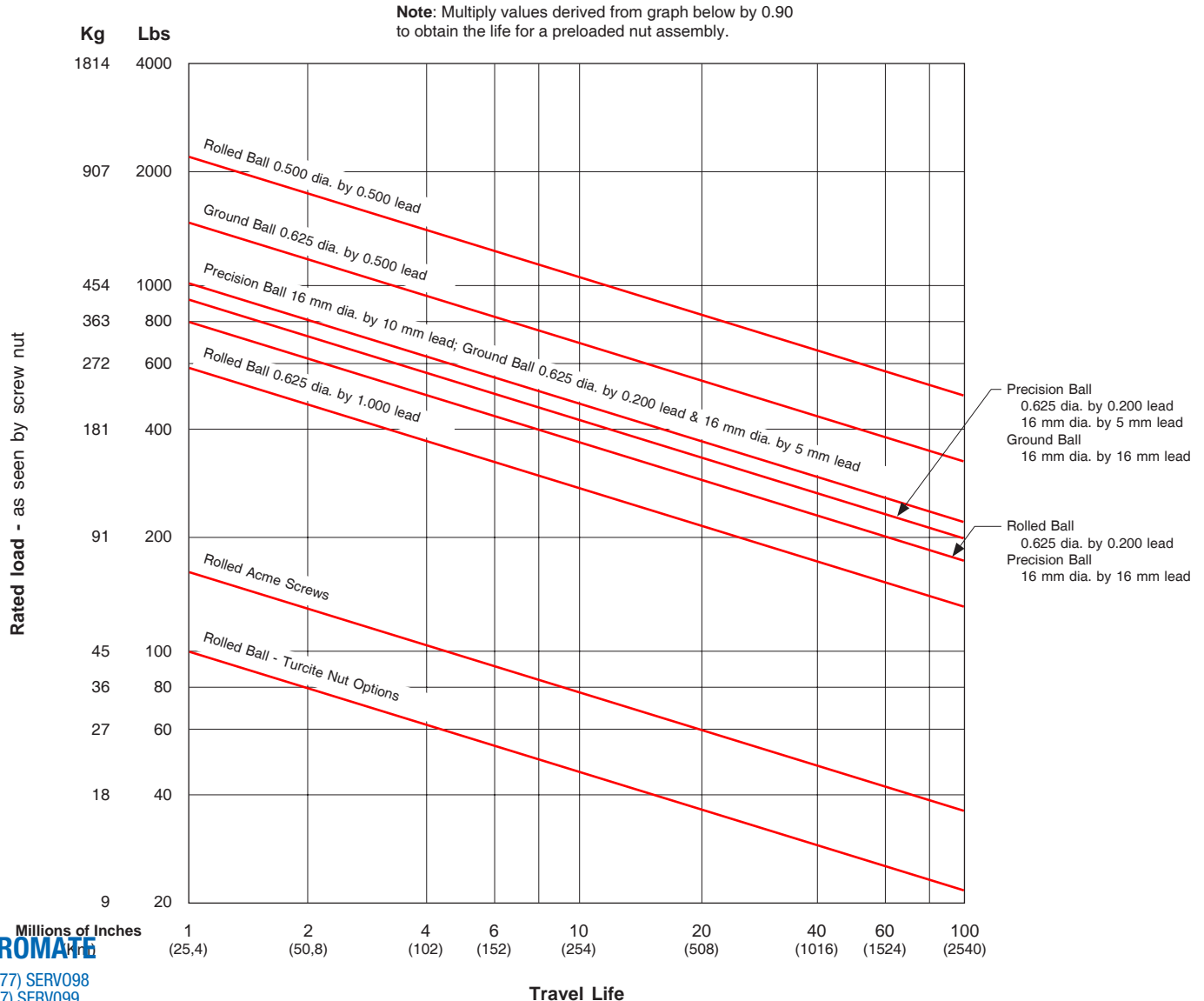
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages C-20 to C-23)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)



Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 100 & 110 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Screws - Acme & Ball

100 Series Model Number	110 Series Model Number	Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)										
		Screw										
		0.500 dia. 0.500 lead	0.625 dia. 0.100 lead	0.625 dia. 0.200 lead	0.625 dia. 0.500 lead	0.625 dia. 1.000 lead	16 mm dia. 4 mm lead	16 mm dia. 5 mm lead	16 mm dia. 10 mm lead	16 mm dia. 16 mm lead		
Travel Length in (mm)	Travel Length in (mm)											
10x402	2 (50)	11x401	1.0 (50)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x404	4 (100)	11x402	2.5 (63)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x406	6 (150)	11x404	4.0 (100)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x408	8 (200)	11x405	5.5 (139)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x412	12 (300)	11x408	8.5 (215)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x416	16 (405)	11x411	11.5 (292)	25.0 (635)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x420	20 (505)	11x414	14.3 (365)	21.5 (546)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	7.9 (201)	9.8 (249)	19.7 (500)	31.5 (800)
10x424	24 (605)	11x417	17.3 (441)	16.1 (409)	4.2 (107)	8.4 (213)	21.0 (533)	41.9 (1064)	6.5 (165)	8.2 (208)	16.4 (416)	26.2 (665)
10x430	30 (760)	11x422	22.0 (558)	11.2 (284)	2.9 (74)	5.8 (147)	14.5 (368)	29.0 (737)	4.5 (114)	5.6 (142)	11.3 (287)	18.1 (460)
10x436	36 (910)	11x428	28.0 (711)	8.2 (208)	2.1 (53)	4.2 (107)	10.6 (269)	21.3 (541)	3.3 (84)	4.1 (104)	8.3 (211)	13.3 (338)
10x442	42 (1060)	11x431	31.7 (806)	6.2 (157)	1.6 (41)	3.3 (81)	8.1 (206)	16.3 (414)	2.5 (63)	3.2 (81)	6.3 (160)	10.1 (257)
10x448	48 (1215)	11x436	36.3 (923)	4.9 (124)	1.3 (33)	2.5 (63)	6.4 (162)	12.8 (325)	2.0 (51)	2.5 (63)	5.0 (127)	8.0 (203)
10x454	54 (1370)	11x440	40.7 (1035)	4.0 (102)	1.0 (25)	2.0 (51)	5.2 (132)	10.4 (264)	1.6 (41)	2.0 (51)	4.0 (102)	6.5 (165)
10x460	60 (1520)	11x445	45.5 (1155)	3.3 (84)	0.8 (20)	1.7 (43)	4.3 (109)	8.6 (218)	1.3 (33)	1.7 (43)	3.3 (84)	5.3 (135)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.500 inch dia. 0.500 inch lead	<i>Non-preloaded</i> (S001)	2,200 (997)	13,350 (6055)	90	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	(2) <i>Preloaded</i> (S002)	1,980 (898)	13,130 (5955)		30 (0,21)			
	<i>Non-preloaded</i> Turcite Nut (S003)	100 (45)	800 (363)	60	25 (0,18)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S004)	90 (41)	800 (363)		40 (0,28)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S005)	800 (363)	6,150 (2790)	90	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S006)	720 (326)	6,070 (2753)		20 (0,14)			
	<i>Non-preloaded</i> Turcite Nut (S007)	100 (45)	800 (363)	60	15 (0,11)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S008)	90 (41)	800 (363)		30 (0,21)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.625 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S009)	590 (267)	2,425 (1100)	90	25 (0,18)	< 0.004 (100)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S010)	530 (240)	2,390 (1084)		40 (0,28)			
	<i>Non-preloaded</i> Turcite Nut (S011)	100 (45)	800 (363)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S012)	90 (41)	800 (363)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 2.2 inch (55,9 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for the 100 series. For the 110 series 1 inch listed travel (this option is not available), for the 2.5 inch listed travel (reduction of travel to 1.0 inch), for the 4 inch listed travel (reduction of travel to 2.75 inches), for the 5.5 inch listed travel (reduction of travel to 4.5 inches), for the 8.0 inch listed travel (reduction of travel to 7.75 inches).

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Screws - Acme & Ball

SCREW	PRECISION BALL SCREWS								
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)	
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S114)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S115)	788 (357)	2,430 (1102)		20 (0,14)				0
16 mm dia. 5 mm lead	<i>Non-preloaded</i> (S116)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S117)	788 (357)	2,430 (1102)		20 (0,14)				0
16 mm dia. 10 mm lead	<i>Non-preloaded</i> (S118)	1,080 (489)	2,630 (1192)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	⁽²⁾ <i>Preloaded</i> (S119)	972 (440)	2,365 (1072)		25 (0,18)				0
16 mm dia. 16 mm lead	<i>Non-preloaded</i> (S120)	819 (371)	1,620 (734)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	⁽³⁾ <i>Preloaded</i> (S121)	737 (334)	1,455 (659)		35 (0,24)				0

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.5 inch (12,7 mm) reduction of carriage travel (from the listed travel length) when using a preloaded nut with this screw option for the 100 series.
- (3) There is a 0.7 inch (17,8 mm) reduction of carriage travel (from the listed travel length) when using a preloaded nut with this screw option for the 100 series.

Screws - Acme & Ball

SCREW	GROUND BALL SCREWS ⁽²⁾							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 dia., 0.200 lead <i>Preloaded</i> (S212)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
0.625 dia., 0.500 lead <i>Preloaded</i> (S213)	1430 (649)	4,191 (1901)	90	30 (0,21)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
16 mm dia., 5 mm lead <i>Preloaded</i> (S214)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
16 mm dia., 16 mm lead <i>Preloaded</i> (S215)	910 (412)	1,800 (816)	90	35 (0,24)	< 0.0012 (30)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

(2) The Ground Ball Screw options are only available in travel lengths up to 36 inches for the 100 series and up to 28 inches of travel for the 110 series.

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Screws - Acme & Ball

SCREW	ROLLED ACME SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.625 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S300)	160 (73)	800 (363)	40	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S301)	140 (64)	720 (327)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S302)	160 (73)	800 (363)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S303)	140 (64)	720 (327)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 4 mm lead	<i>Non-preloaded</i> (S304)	160 (73)	800 (363)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S305)	140 (64)	720 (327)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

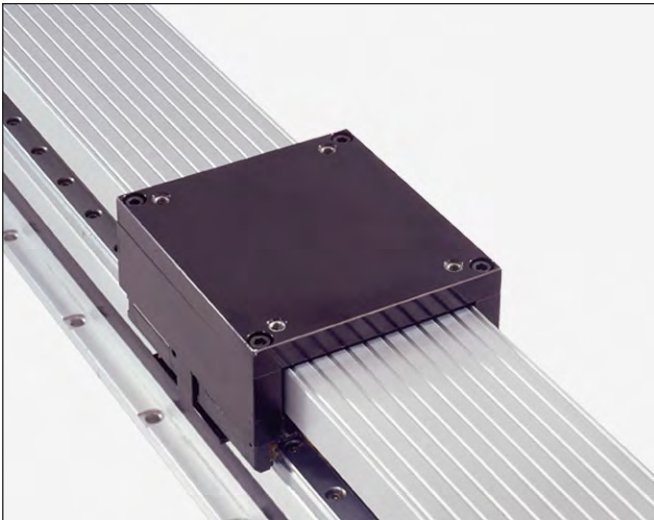
Single or Multiple Axis

LINTECH's 120 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 120 series tables are designed to handle light loads at very high speeds. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. The drive system uses two pulleys, along with a high strength, steel reinforced polyurethane belt, which provides 3.543 inches (90 mm) of linear movement per revolution of the input shaft. The simple belt tensioning system allows for easy adjustment of belt tension by the user. NEMA 23 & 34 motor mounts, or gearhead mounts are available as well as planetary gearheads.



Available Options

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

End of Travel and Home Switches

The 120 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Motor Adapter Brackets

NEMA 34 or any metric mount motor can be mounted to a 120 series positioning table with the use of adapter brackets.

Rotary Encoders

Incremental rotary encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Planetary Gearheads

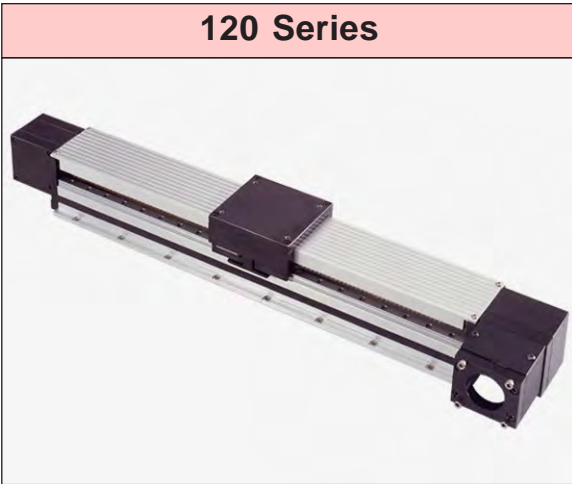
LINTECH provides planetary gearheads which can be used with a 120 series. These gearheads are provided in either an in-line or right angle version, with standard gear ratios of 1:1, 2:1 & 3:1. Gearheads may be required for applications which have a large mismatch of load to motor inertias. They also help reduce the torque required from the motor for a particular application.

Other

The 120 series tables can accommodate **chrome plated linear bearings & rails** for corrosive environment applications and **power-off electric brakes** for load locking applications.

Standard Features - 120 Series

- ❑ Compact 3.500 inches (89 mm) wide by 3.000 inches (76 mm) tall
- ❑ Travel lengths from 4 inches (100 mm) to 10 feet (3,0 meters)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ Polyurethane belt with high strength steel tension members
- ❑ 0° F to +176° F (-18° C to +80° C) operating temperature
- ❑ Single screw belt tensioning with self locking thread
- ❑ Dynamic Load Capacity to 3,100 lbs (1406 kg)
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design
- ❑ 2 rails, 2 or 4 bearing carriages

120 Series**Options - 120 Series**

- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via the internet
- ❑ Adapter brackets for non-NEMA motors
- ❑ Chrome plated linear bearings & rails
- ❑ Rotary incremental encoders
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Carriage adapter plates
- ❑ Vertical angle bracket
- ❑ Motor couplings

	12	4	4	004	CP1	1	D1	M02	C155	L04	E00	B00
Table Series _____												
Number of Bearings _____												
2 - 2 bearing per carriage												
4 - 4 bearings per carriage												
Carriage Length _____												
4 - 4 inches												
Travel Length (see pages C-28 & C-30) _____												
004 - 4 to 120 inches												
Cover Plate _____												
CP0 - no cover plate												
CP1 - top cover plate only												
Carriage Inserts (see pages C-29 & C-31) _____												
1 - English mount												
2 - Metric mount												
Drive Shaft (see pages C-29 & C-31) _____												
D1 - Right Hand single shaft												
D2 - Left Hand single shaft												
D3 - Right Hand thru shaft												
D4 - Left Hand thru shaft												
Motor Mount (see pages C-29, C-31 & C-46) _____												
M00 - none												
M99 - other												
M02 - NEMA 23 mount (E)												
M03 - NEMA 23 mount (M)												
M04 - NEMA 34 mount (E)												
M05 - NEMA 34 mount (M)												
Coupling Options (see pages C-40 & C-41) _____												
C000 - none												
C999 - none												
C130 to C134 - H100												
C155 to C164 - H131												
C190 to C200 - H163												
C407 to C413 - G100												
C435 to C444 - G126												
C470 to C480 - G158												
Limit & Home Switches (see pages C-37 to C-39) _____												
L00 - no switches												
L99 - other												
EOT & home switches	Reed	Hall	Prox (NPN)	Prox (PNP)								
EOT switches only	L04	L07	L10	L13								
home switch only	L05	L08	L11	L14								
	L06	L09	L12	L15								
Encoder Options (see page C-49) _____												
E00 - none												
E01 - rotary (500 lines/rev)												
E02 - rotary (1000 lines/rev)												
E03 - rotary (1270 lines/rev)												
E99 - other												
<i>note: When selecting any rotary encoder option, the Drive Shaft D3 or D4 above is required.</i>												
Power-off Brakes (see page C-48) _____												
B00 - none												
B01 - 24 VDC												
B02 - 90 VDC												
B99 - other												
<i>note: When selecting any brake option, the Drive Shaft D3 or D4 above is required.</i>												

(E) - English Interface
(M) - Metric Interface

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	1,550 lbs	(703 kg)	3,100 lbs	(1406 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	525 lbs	(238 kg)	1,060 lbs	(480 kg)
Static Horizontal		2,360 lbs	(1070 kg)	4,720 lbs	(2140 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	140 ft-lbs	(190 N-m)	280 ft-lbs	(379 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	47 ft-lbs	(64 N-m)	95 ft-lbs	(129 N-m)
Static Roll Moment		210 ft-lbs	(285 N-m)	425 ft-lbs	(576 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	18 ft-lbs	(24 N-m)	240 ft-lbs	(325 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	6 ft-lbs	(8 N-m)	82 ft-lbs	(111 N-m)
Static Pitch & Yaw Moment		30 ft-lbs	(41 N-m)	365 ft-lbs	(495 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	775 lbs	(351 kg)	775 lbs	(351 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	263 lbs	(119 kg)	263 lbs	(119 kg)
Each Bearing Static Load Capacity		1,180 lbs	(535 kg)	1,180 lbs	(535 kg)
Maximum Belt Tensile Force		250 lbs	(113 kg)	250 lbs	(113 kg)
Maximum Carriage Thrust Force		115 lbs	(52 kg)	115 lbs	(52 kg)
Maximum Speed		118 in/sec	(3 m/sec)	118 in/sec	(3 m/sec)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	2.375 in	(60,3 mm)	2.375 in	(60,3 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	2.088 in	(53,0 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.375 in	(34,9 mm)	1.375 in	(34,9 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate - 6061 anodized aluminum
Linear Rail Material	Stainless Steel
Belt Properties	Black, 16 mm wide, Polyurethane, Steel reinforced belt
Drive Pulley Weight	0.21 lbs (0,10 kg)
Drive Pulley Diameter	1.128 in (28,65 mm)
Drive Lead	3.543 in (90,00 mm)
Belt Stretch - x Load (lbs or N)	0.00025 in/ft per lbs (0,00476 mm/m per N)
Unidirectional Repeatability	+/- 0.001 in (+/- 0,0254 mm)
Bidirectional Repeatability	+/- 0.004 in (+/- 0,1016 mm)
Position Accuracy (Belt) ⁽¹⁾	< 0.010 in/ft (< 0,254 mm/300mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Breakaway Torque	< 60 oz-in (0,424 N-m)
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, and Gearheads
Coupling	Two (2) different styles available

Footnotes:

(1) Position accuracy varies based on belt stretch. The given rating is based upon a carriage speed of 5 inches/sec (127 mm/sec) and a no load condition.

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Belt Weight ounces (gm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	E	M		
12x4004-CP0	4 (100)	8.0 (203,2)	14.000 (355,6)	0.250 (6,3)	2.500 (63,5)	1	8	1.3 (36,8)	8.4 (3,8)
12x4006-CP0	6 (150)	10.0 (254,0)	16.000 (406,4)	1.250 (31,7)	2.500 (63,5)	1	8	1.5 (42,5)	9.1 (4,1)
12x4008-CP0	8 (200)	12.0 (304,8)	18.000 (457,2)	0.250 (6,3)	2.000 (50,8)	3	12	1.7 (48,2)	9.8 (4,4)
12x4012-CP0	12 (300)	16.0 (406,4)	22.000 (558,8)	0.250 (6,3)	1.500 (38,1)	5	16	2.1 (59,5)	11.1 (5,0)
12x4016-CP0	16 (405)	20.0 (508,0)	26.000 (660,4)	1.250 (31,7)	2.500 (63,5)	5	16	2.5 (70,9)	12.4 (5,6)
12x4020-CP0	20 (505)	24.0 (609,6)	30.000 (762,0)	0.750 (19,0)	2.500 (63,5)	7	20	2.9 (82,2)	13.7 (6,2)
12x4024-CP0	24 (605)	28.0 (711,2)	34.000 (863,6)	0.250 (6,3)	2.500 (63,5)	9	24	3.3 (93,6)	15.1 (6,8)
12x4030-CP0	30 (760)	34.0 (863,6)	40.000 (1016,0)	0.750 (19,0)	2.500 (63,5)	11	28	3.9 (110,6)	17.1 (7,8)
12x4036-CP0	36 (910)	40.0 (1016,0)	46.000 (1168,4)	1.250 (31,7)	2.500 (63,5)	13	32	4.5 (127,6)	19.1 (8,7)
12x4042-CP0	42 (1060)	46.0 (1168,4)	52.000 (1320,8)	1.750 (44,4)	2.500 (63,5)	15	36	5.1 (144,6)	21.1 (9,6)
12x4048-CP0	48 (1215)	52.0 (1320,8)	58.000 (1473,2)	2.250 (57,1)	2.500 (63,5)	17	40	5.7 (161,6)	23.1 (10,4)
12x4054-CP0	54 (1370)	58.0 (1473,2)	64.000 (1625,6)	0.250 (6,3)	2.500 (63,5)	21	48	6.3 (178,6)	25.1 (11,4)
12x4060-CP0	60 (1520)	64.0 (1625,6)	70.000 (1778,0)	0.750 (19,0)	2.500 (63,5)	23	52	6.9 (195,6)	27.1 (12,3)
12x4072-CP0	72 (1820)	76.0 (1930,4)	82.000 (2082,8)	1.750 (44,4)	2.500 (63,5)	27	60	8.1 (229,6)	31.1 (14,1)
12x4084-CP0	84 (2130)	88.0 (2235,2)	94.000 (2387,6)	0.250 (6,3)	2.500 (63,5)	33	72	9.3 (263,7)	35.1 (15,9)
12x4096-CP0	96 (2435)	100.0 (2540,0)	106.000 (2692,4)	1.250 (31,7)	2.500 (63,5)	37	80	10.5 (297,7)	39.1 (17,7)
12x4108-CP0	108 (2740)	112.0 (2844,8)	118.000 (2997,2)	2.250 (57,1)	2.500 (63,5)	41	88	11.7 (331,7)	43.1 (19,6)
12x4120-CP0	120 (3045)	124.0 (3149,6)	130.000 (3302,0)	0.750 (19,0)	2.500 (63,5)	47	100	12.9 (365,7)	47.1 (21,4)

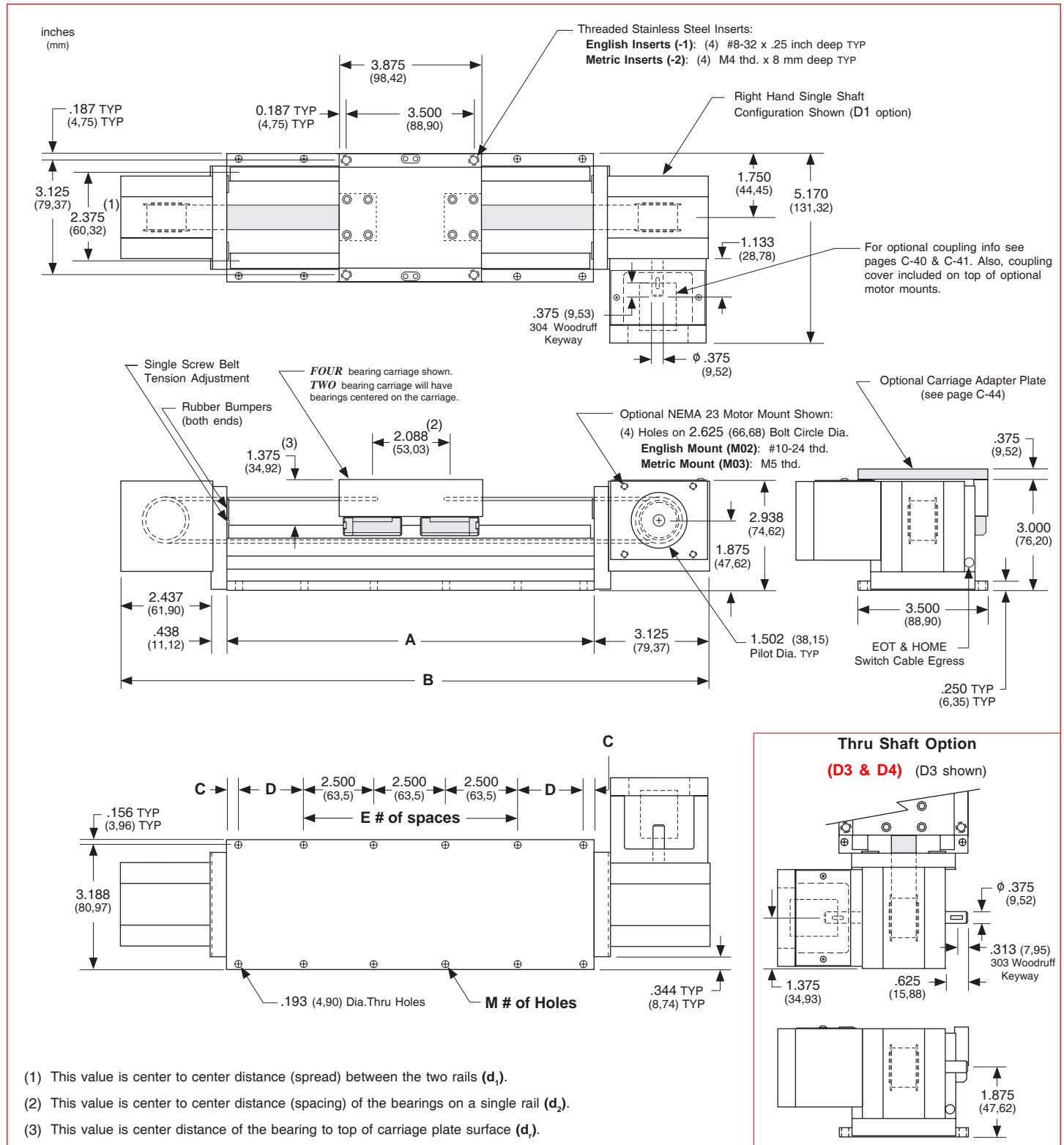
- ┌ x = 2; Carriage has 2 bearings; Carriage weight = 1.6 lbs. (0,73 kg)
- └ x = 4; Carriage has 4 bearings; Carriage weight = 1.8 lbs. (0,82 kg)

Footnotes:

(1) Weight shown is with a 2 bearing carriage [1.6 lbs (0,73 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- Without Cover Plates -



Note: Any 100, 110, 120 or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. *LINTECH's* 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length ⁽¹⁾ inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Belt Weight ounces (gm)	Table Weight ⁽²⁾ lbs (kg)
		A	B	C	D	E	M		
12x4004-CP1	4 (100)	8.0 (203,2)	14.000 (355,6)	0.250 (6,3)	2.500 (63,5)	1	8	1.3 (36,8)	8.4 (3,8)
12x4006-CP1	6 (150)	10.0 (254,0)	16.000 (406,4)	1.250 (31,7)	2.500 (63,5)	1	8	1.5 (42,5)	9.1 (4,1)
12x4008-CP1	8 (200)	12.0 (304,8)	18.000 (457,2)	0.250 (6,3)	2.000 (50,8)	3	12	1.7 (48,2)	9.8 (4,4)
12x4012-CP1	12 (300)	16.0 (406,4)	22.000 (558,8)	0.250 (6,3)	1.500 (38,1)	5	16	2.1 (59,5)	11.1 (5,0)
12x4016-CP1	16 (405)	20.0 (508,0)	26.000 (660,4)	1.250 (31,7)	2.500 (63,5)	5	16	2.5 (70,9)	12.4 (5,6)
12x4020-CP1	20 (505)	24.0 (609,6)	30.000 (762,0)	0.750 (19,0)	2.500 (63,5)	7	20	2.9 (82,2)	13.7 (6,2)
12x4024-CP1	24 (605)	28.0 (711,2)	34.000 (863,6)	0.250 (6,3)	2.500 (63,5)	9	24	3.3 (93,6)	15.1 (6,8)
12x4030-CP1	30 (760)	34.0 (863,6)	40.000 (1016,0)	0.750 (19,0)	2.500 (63,5)	11	28	3.9 (110,6)	17.1 (7,8)
12x4036-CP1	36 (910)	40.0 (1016,0)	46.000 (1168,4)	1.250 (31,7)	2.500 (63,5)	13	32	4.5 (127,6)	19.1 (8,7)
12x4042-CP1	42 (1060)	46.0 (1168,4)	52.000 (1320,8)	1.750 (44,4)	2.500 (63,5)	15	36	5.1 (144,6)	21.1 (9,6)
12x4048-CP1	48 (1215)	52.0 (1320,8)	58.000 (1473,2)	2.250 (57,1)	2.500 (63,5)	17	40	5.7 (161,6)	23.1 (10,4)
12x4054-CP1	54 (1370)	58.0 (1473,2)	64.000 (1625,6)	0.250 (6,3)	2.500 (63,5)	21	48	6.3 (178,6)	25.1 (11,4)
12x4060-CP1	60 (1520)	64.0 (1625,6)	70.000 (1778,0)	0.750 (19,0)	2.500 (63,5)	23	52	6.9 (195,6)	27.1 (12,3)
12x4072-CP1	72 (1820)	76.0 (1930,4)	82.000 (2082,8)	1.750 (44,4)	2.500 (63,5)	27	60	8.1 (229,6)	31.1 (14,1)

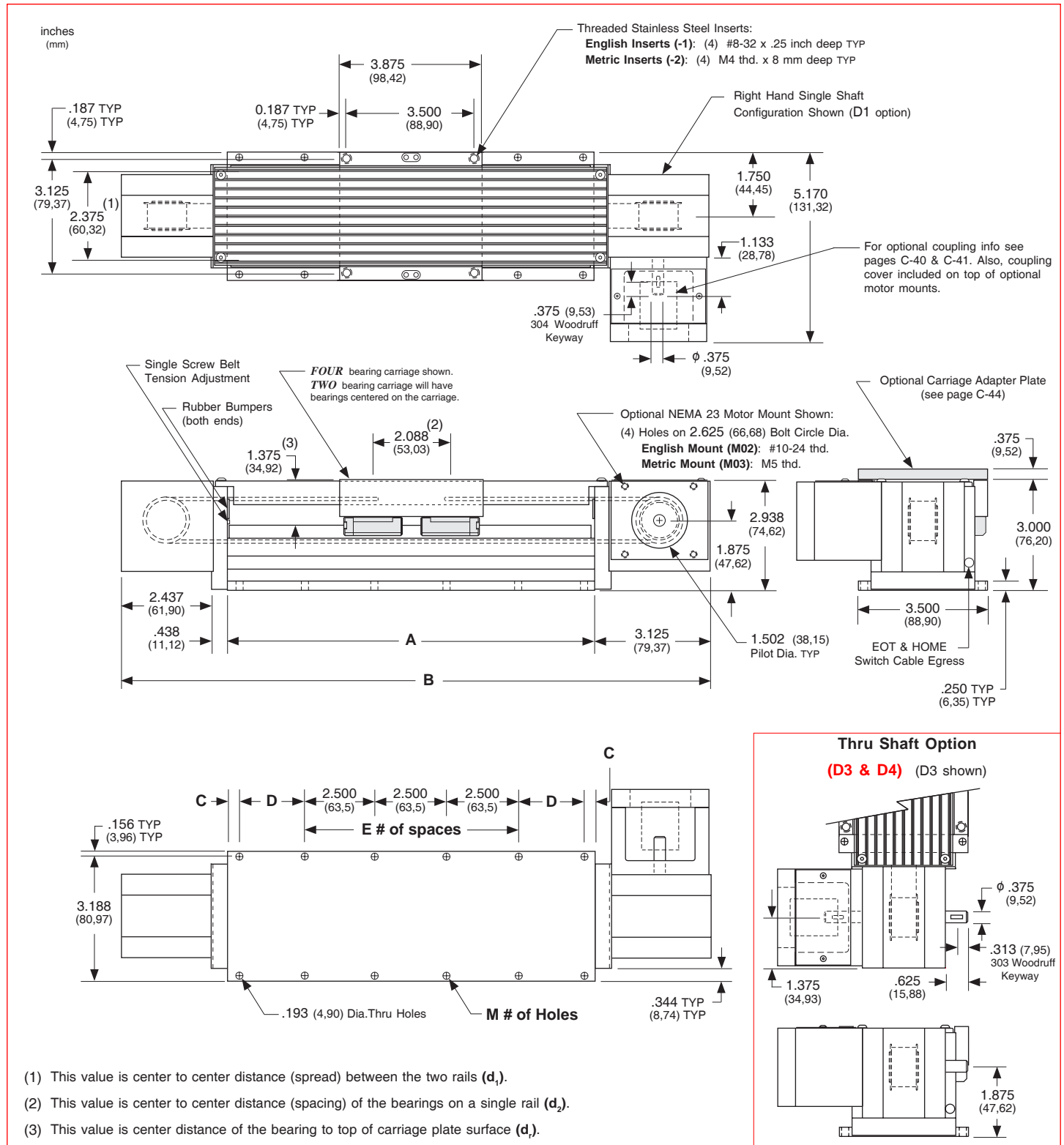
- x = 2; Carriage has 2 bearings; Carriage weight = 1.6 lbs. (0,73 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 1.8 lbs. (0,82 kg)

Footnotes:

- (1) For travels greater than 72 inches (1820 mm) a cover plate (-CP1) cannot be used due to the sag of the cover plate.
- (2) Weight shown is with a 2 bearing carriage [1.6 lbs (0,73 kg)], a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.2 lbs (0,09 kg) to each value.

Dimensions

- With Top Cover Plate Only -



Note: Any 100, 110, 120 or 130 series table can be mounted on top of any second 100, 110, 120 series table by the user, in order to create X-Y multiple axis configurations. The 100-CP1, 100-CP2, or 120 series tables require one of the *Carriage Adapter Plate* options. The carriage's threaded stainless steel insert hole pattern exactly matches the base mounting hole pattern on each table, therefore no extra adapter bracket or machining is required. However a precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds. The table base, carriage top & carriage sides are all precision machined. *LINTECH's* 100 series, 4 bearing carriage, should be used for the bottom axis in a multiple axes application for better system rigidity, performance, and life.

Maximum Motor Input Torque, Maximum Belt Force, & Maximum Acceleration Rate

Maximum Motor Input Torque

The maximum safe speed/torque of a motor/drive system that can be used with the 120 series, is limited by the belt strength at a given speed. The maximum linear forces the belt can adequately handle are determined by the number of teeth on the pulley and the belt width. The chart below illustrates the relationship between motor input torque/belt force and carriage speed. Care should be taken when sizing and selecting a motor/drive system for use with a 120 series table. Exceeding the maximum input torque values at the listed speeds can cause belt "skipping" over pulley teeth. This will result in mis-positioning of the carriage.

Maximum Acceleration

The maximum acceleration rate using a 120 series table can be determined by the simple equation $F = M \times A$. Knowing the mass of the load, and the maximum safe operating force for the belt, the maximum possible acceleration rate can be determined. **Note:** The mechanical limitation for acceleration of the 120 series table is 2 g's.

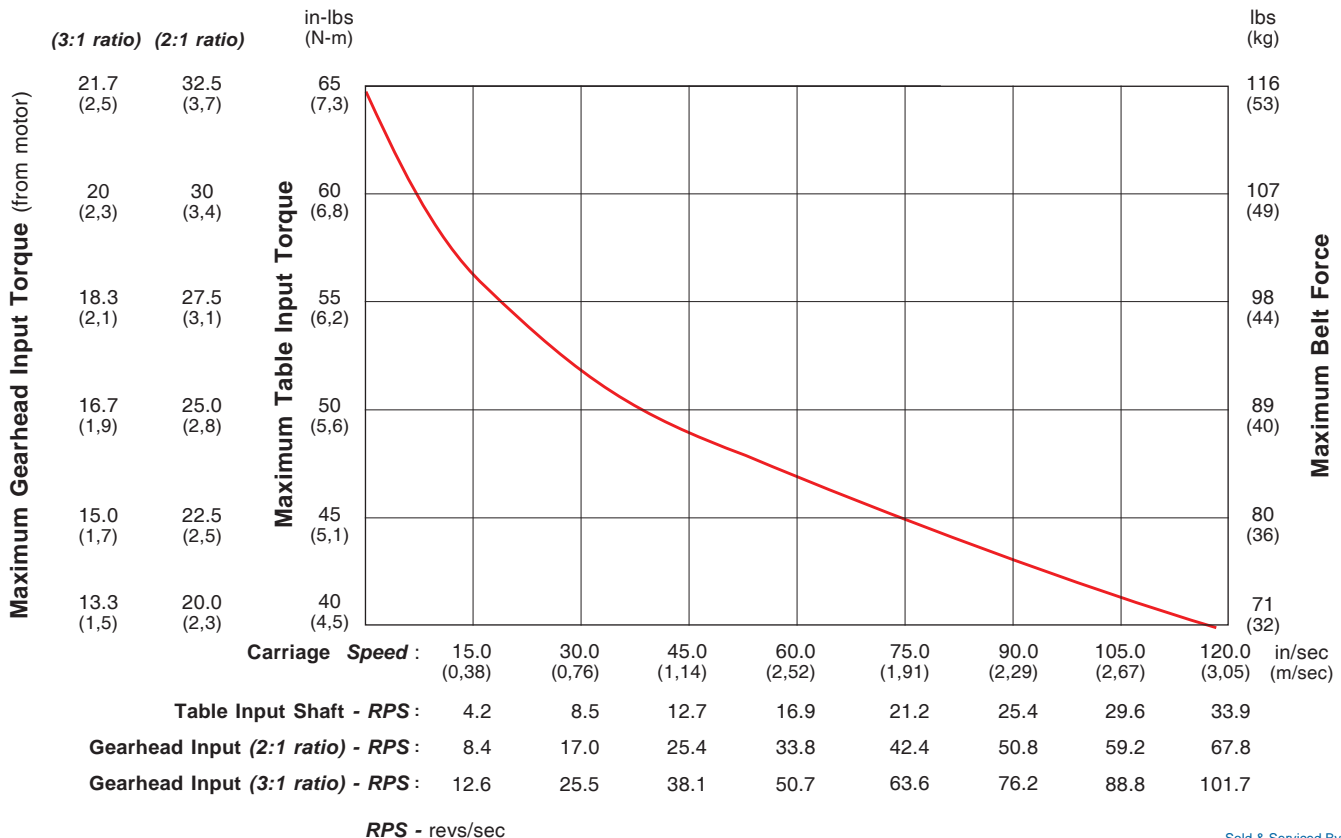
Maximum Acceleration Example

- F** = **M** x **A**
- F** = maximum belt force at desired speed
- M** = user applied load
- A** = maximum acceleration rate (g's)
- Sin ϕ** = angle of table from horizontal (degrees)

<i>Horizontal Application</i>	<i>Vertical Application</i>
$A = \frac{F}{M}$	$A = \frac{F - M \sin \phi}{M}$

Example: A 40 lb load is mounted to a 120 series carriage in a horizontal application. Determine the maximum acceleration rate in g's & in/sec² that can be used to achieve a maximum speed of 75 IPS.

- Step 1:** From graph below, determine the maximum belt force at 75 IPS : (**F = 80 lbs**).
- Step 2:** Add up your total mass = load weight + carriage weight : (**M = 40 + 1.8 = 41.8 lbs**).
- Step 3:** Solve for A : (**A = 80/41.8 = 1.9 g's**).
- Note:** 1 g = 386 in/sec²
- Step 5:** 1.9 g's x 386 = 733 in/sec².



- 1) Table friction & breakaway forces have already been deducted from the above maximum belt force values.
- 2) Curve based upon maximum belt values. Select a motor coupling that can handle the required torque.

Master/Slave 120 Series Configuration

For some X-Y belt drive applications, the master/slave configuration shown to the right may be required. This system provides two bottom (X) axes spread apart a set distance, yet driven by one motor. The spreading of the two bottom axes minimizes the deflection on the Y axis, reduces the moment loading on the X axes carriages, increases the system rigidity, and prevents twisting of the Y axis as it accelerates to a set speed. *LINTECH* can provide the shaft supports, the cross shaft, the couplings, and the 120 series belt drive table without a motor mount bracket. The shaft supports are required as the couplings DO NOT provide adequate support of the shaft by themselves. Also, the shaft supports prevent the cross shaft from "whipping" at long lengths and high speeds.

The chart below lists the maximum carriage speed available with a given distance between shaft supports. A minimum of two shaft supports is always required. More than two can be used to increase the speed of a longer spread system. The equations below show the relationship between the # of shaft supports, the spread between the two bottom axes (B), and the distance between individual shaft supports (A).

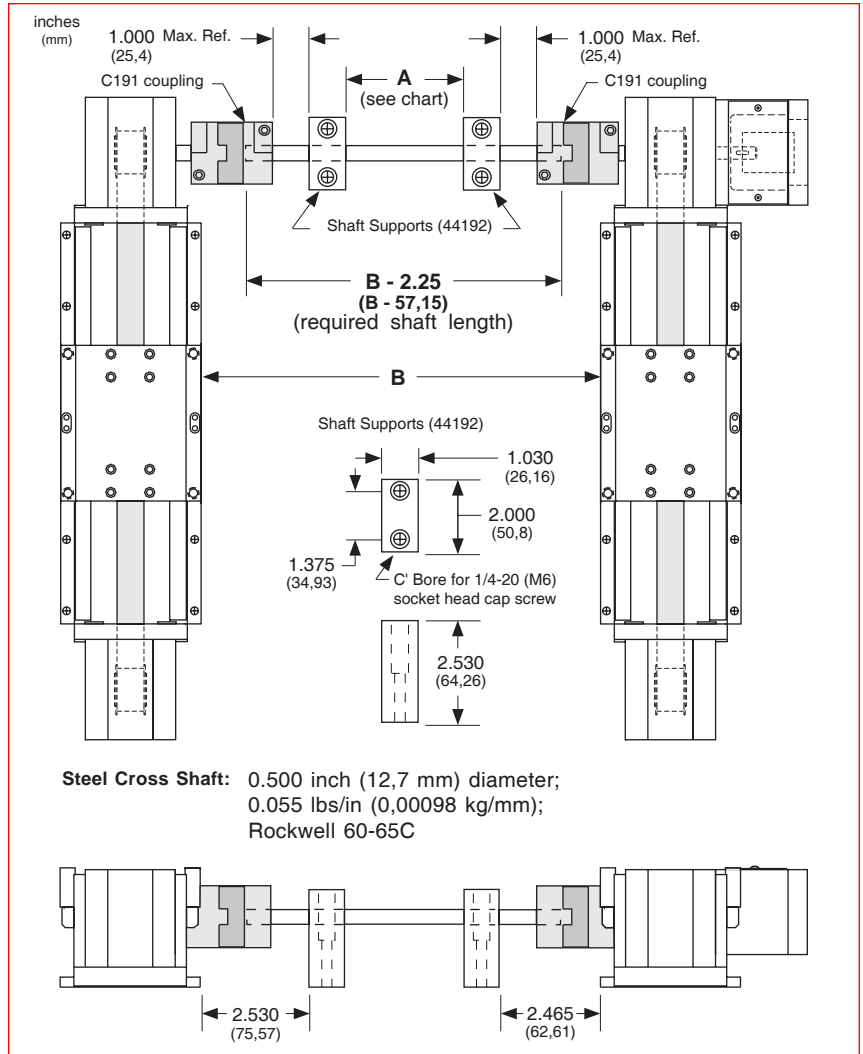
A = distance between shaft supports

B = distance between 2 bottom axes

2 Shaft Supports: **A** = [**B** - 7.50 in (190,5 mm)]

3 Shaft Supports: **A** = [**B** - 8.53 in (216,7 mm)] / 2

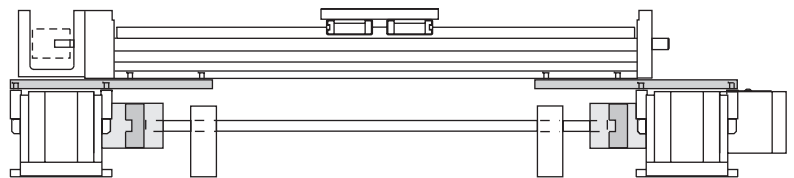
4 Shaft Supports: **A** = [**B** - 9.56 in (242,8 mm)] / 3



Maximum Distance Between Shaft Supports		Maximum Shaft Speed (RPM)	Equivalent Carriage Speed	
A			(in/sec)	(mm/sec)
(inches)	(mm)			
<= 30	762	2000	118	3000
<= 36	914	1500	89	2250
<= 48	1219	840	50	1260
<= 54	1372	660	39	990
<= 60	1524	535	32	802
<= 66	1676	440	26	660
<= 72	1829	370	22	555
<= 84	2134	270	16	405
<= 96	2438	208	12	312
<= 108	2743	164	10	246
<= 120	3048	133	8	200

Note: The user is required to supply the mounting surface for the above configurations. *LINTECH* normally only supplies all the positioning hardware. A common base plate can be provided by *LINTECH* upon request.

Example #1: Above configuration with Y axis and 2 extended carriage adapter plates.



Example #2: Above configuration with Y axis, 2 extended carriage adapter plates, and 2 horizontal angle brackets.

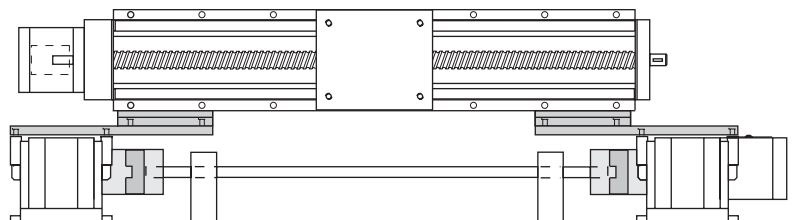
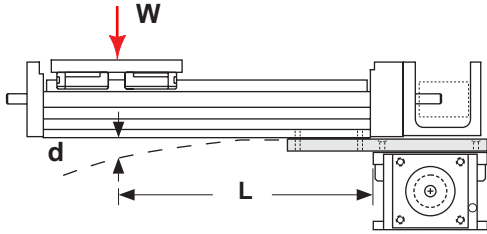
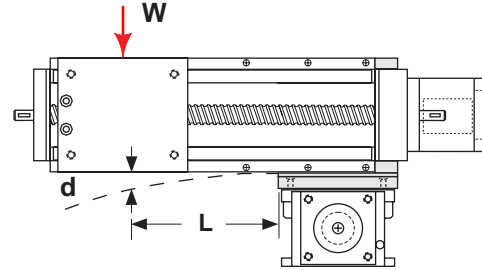
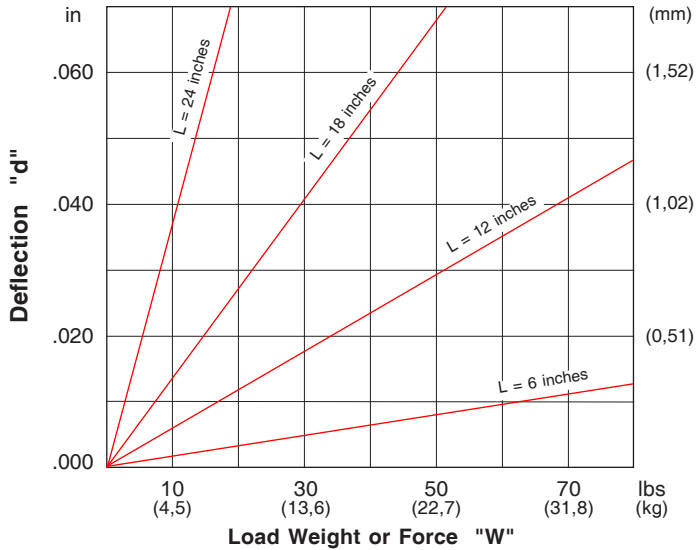


Table Deflection - Multiple Axis Configurations

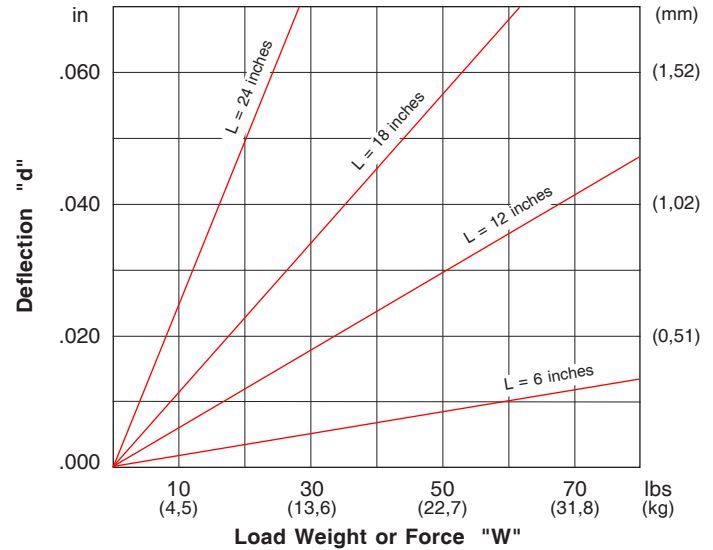
The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection. The following graphs can be used to estimate the deflection value for a given configuration. The information in the graphs was obtained with the bottom axis firmly mounted to a granite surface plate and also includes the deflection of the bottom axis carriage assembly & all mounting hardware. Individual applications will vary depending on the user mounting surface, user mounting hardware, and user mounting configuration. If the deflection values below are too high for your application, a steel sub plate, or aluminum cross member, can be added for additional "Y" axis support. Contact *LINTECH* for more details.



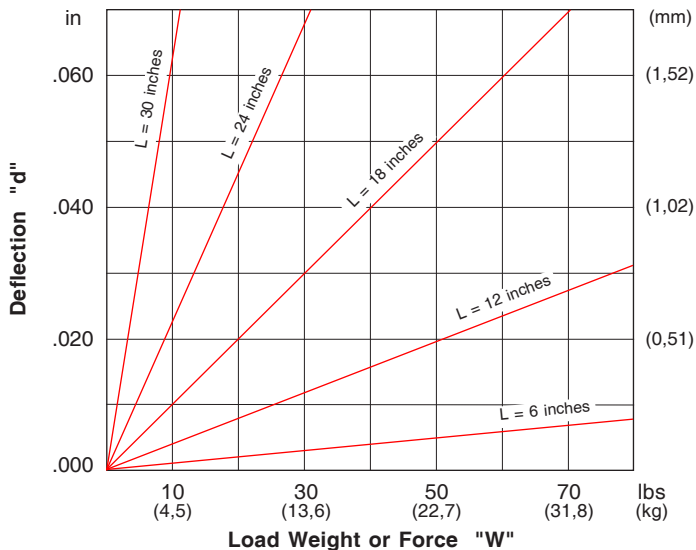
2 Bearing 100, 110 or 120 Series on Bottom Axis



2 Bearing 100, 110 or 120 Series on Bottom Axis



4 Bearing 100, 110 or 120 Series on Bottom Axis



4 Bearing 100, 110 or 120 Series on Bottom Axis

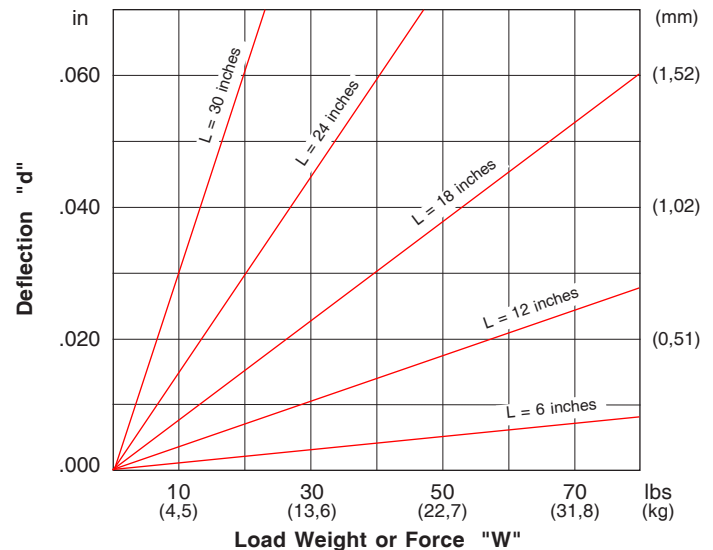
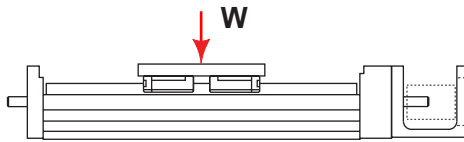
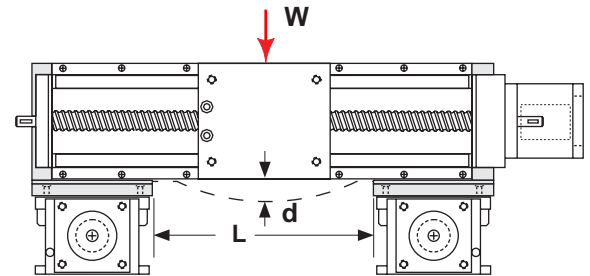
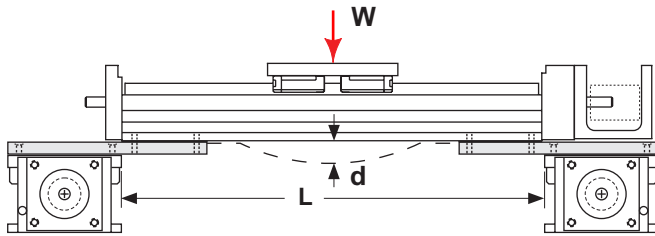
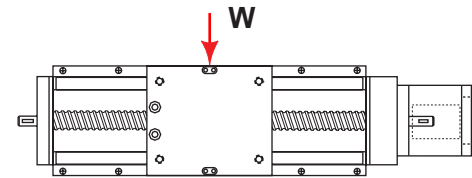


Table Deflection - Multiple Axis Configurations

$I = 0.30 \text{ in}^4 (1.25 \times 10^5 \text{ mm}^4)$

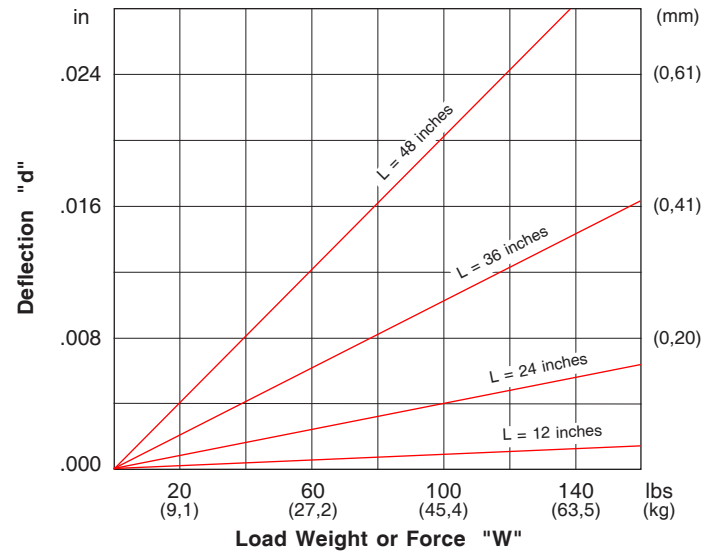
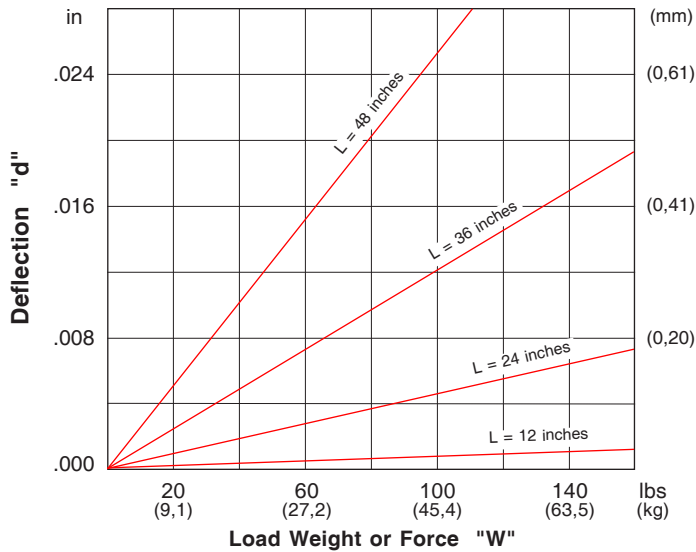


$I = 3.50 \text{ in}^4 (1.46 \times 10^6 \text{ mm}^4)$



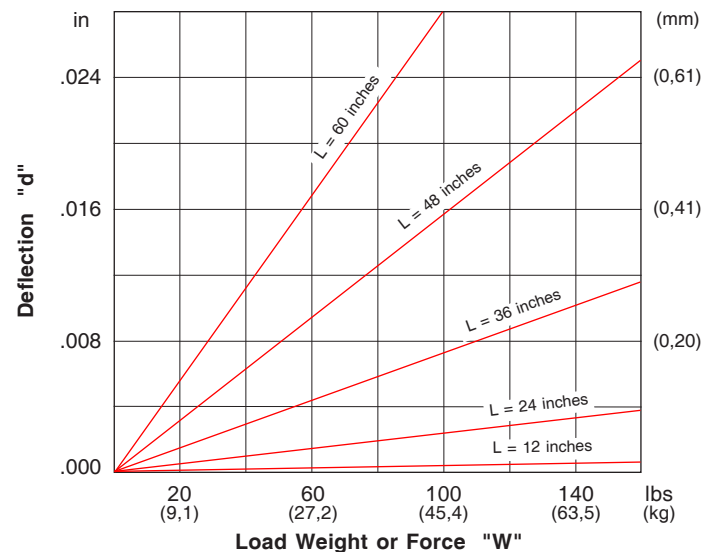
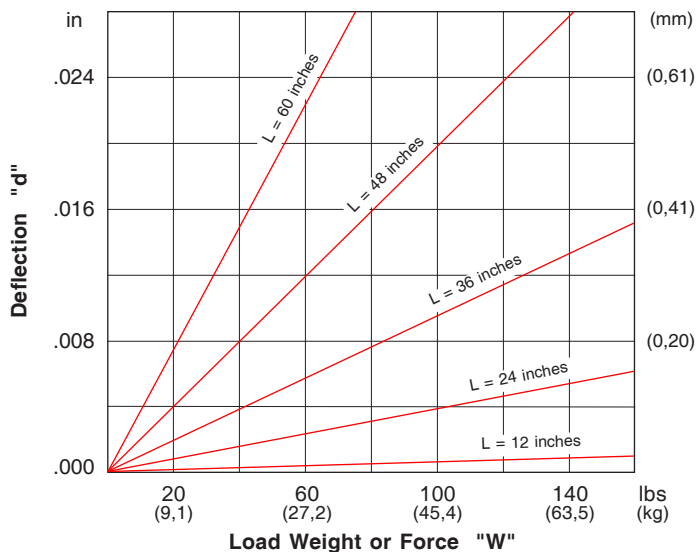
2 Bearing 100, 110 or 120 Series on Bottom Axis

2 Bearing 100, 110 or 120 Series on Bottom Axis



4 Bearing 100, 110 or 120 Series on Bottom Axis

4 Bearing 100, 110 or 120 Series on Bottom Axis

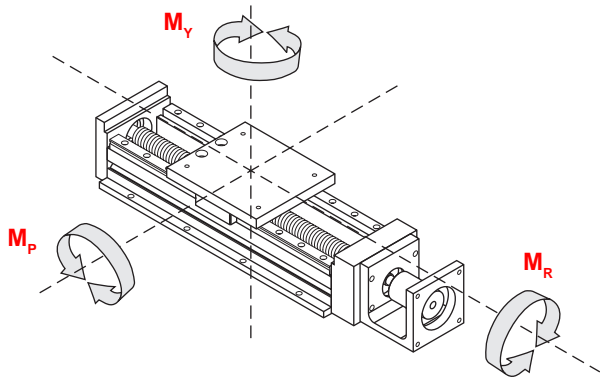


Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 100, 110 or 120 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

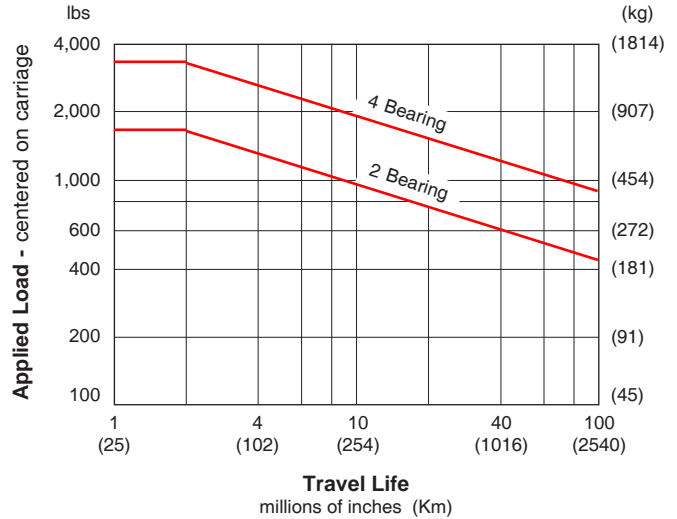
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	1,550	(703)	3,100	(1406)
50	(1270)	525	(238)	1,060	(480)
100	(2540)	415	(188)	840	(381)

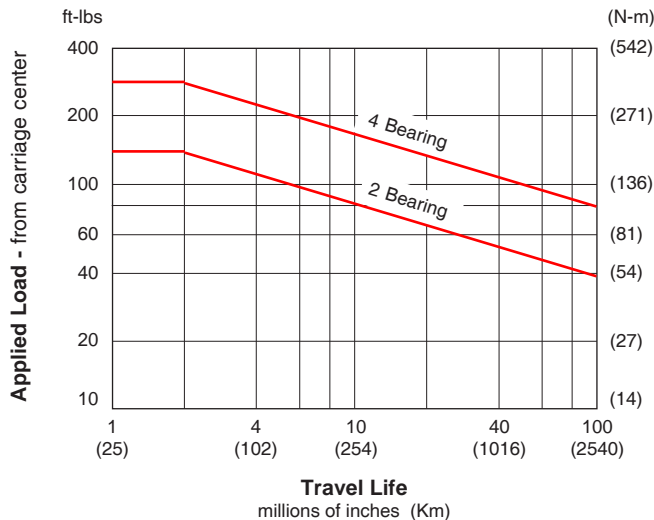


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	140	(190)	280	(379)
50	(1270)	47	(64)	95	(129)
100	(2540)	37	(50)	75	(101)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

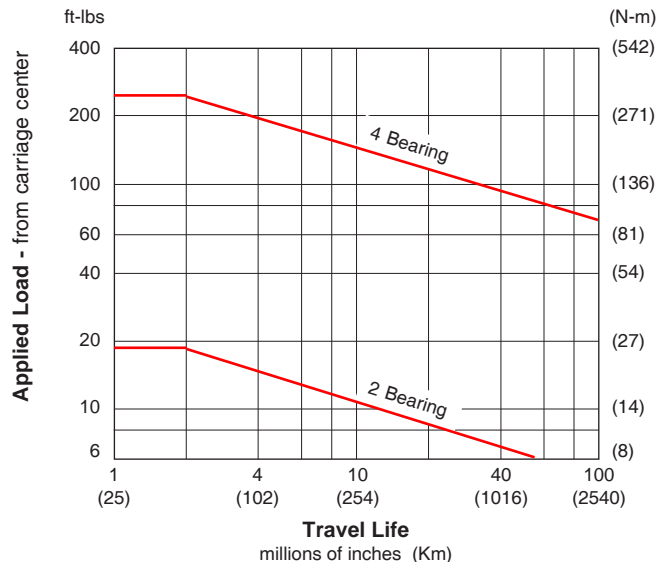


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	18	(24)	240	(325)
50	(1270)	6	(8)	82	(111)
100	(2540)	5	(7)	65	(88)

Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)



End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 100, 110 or 120 series table, each switch is mounted to the side of the table, while the actuating cams are mounted to the carriage assembly. The *T-slot* which runs along both sides of the 100, 110 and 120 series, allows the switches to be located anywhere along the table. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

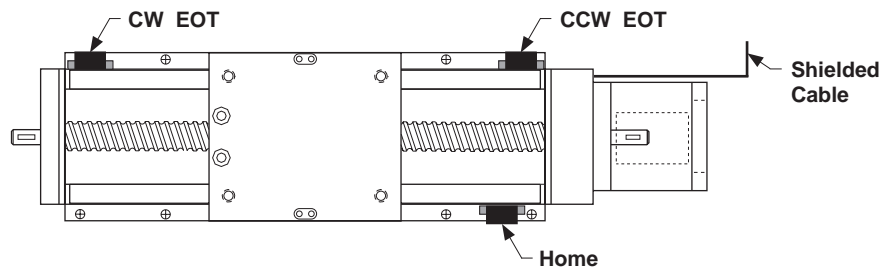
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located on the opposite side of the EOT switches, at the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 100 & 120 series, EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #. For the 110 series there is NO reduction of listed travel length when using EOT switches.

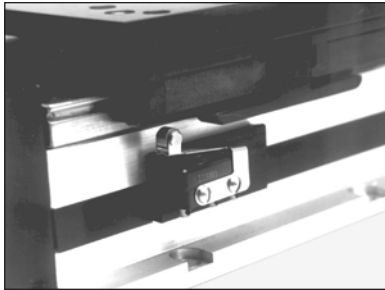
Note: Each switch can be located anywhere along the T-slots, which run on both sides of the table.

Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

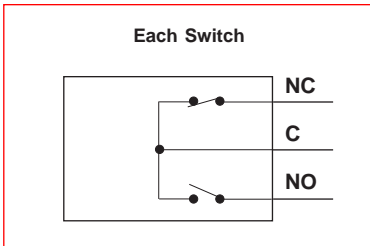
Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

End of Travel (EOT) Switches & Home Switch

Mechanical Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 amps @ 125 VAC
1 amp @ 85 VDC
- Activation Style : mechanical cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 85° C
- Environment : non wash down
- Added Table Width : 0.063 inch (1,6 mm) (EOT switches)
0.063 inch (1,6 mm) (with Home switch)
- Individual Switch Wiring : none

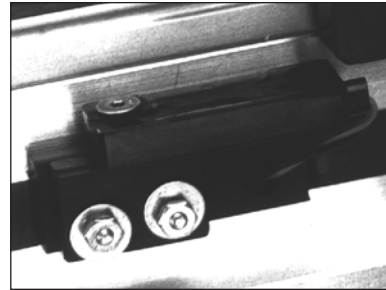


Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

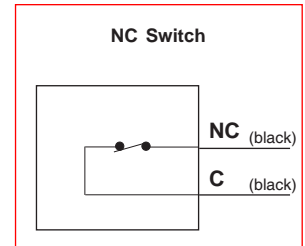
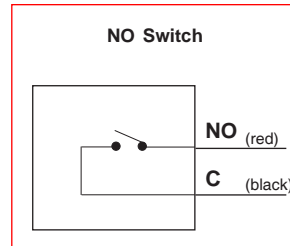
Wire Color	Description
Black	CW EOT NC
Blue	CW Common
Red	CCW EOT NC
White	CCW Common
Brown	HOME NO
Green	HOME Common
Silver	Shield

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches



- Repeatability : +/- 0.0020 inch (50 microns)
- Electrical : 1.0 amps @ 125 VAC
0.5 amps @ 100 VDC
- Activation Style : magnetic
- Activation Area : 0.30 inches (7,62 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : non wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description
Black	CW EOT NC
Blue	CW Common
Red	CCW EOT NC
White	CCW Common
Brown	HOME NO
Green	HOME Common
Silver	Shield

- CW - Clockwise
- CCW - Counter Clockwise
- EOT - End of Travel
- NC - Normally Closed
- NO - Normally Open

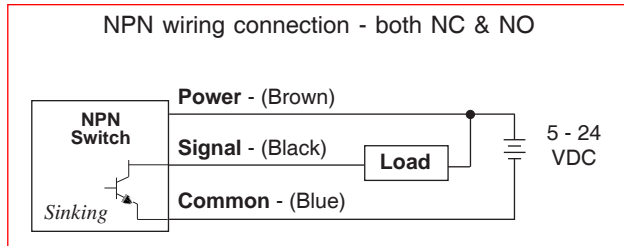
Sold & Serviced By:
ELECTROMATE
Toll Free Phone (877) SERV098
Toll Free Fax (877) SERV099
www.electromate.com
sales@electromate.com

End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



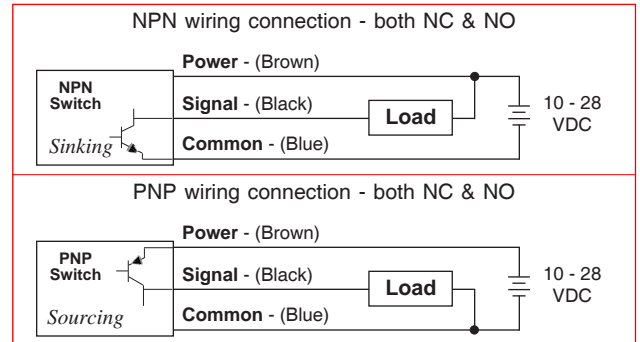
Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 10 - 28 VDC
15 mA - power input
100 mA max - signal
- Actuation Style : non-magnetic cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 75° C
- Environment : IEC IP67 wash down
- Added Table Width : 0.20 inch (5,1 mm) (EOT switches)
0.20 inch (5,1 mm) (Home switch)
- Individual Switch Wiring : 6.5 foot (2 m) cable for NPN
3.3 foot (1 m) cable for PNP

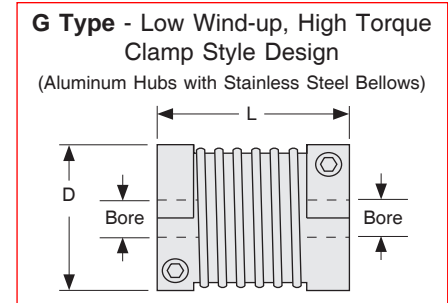
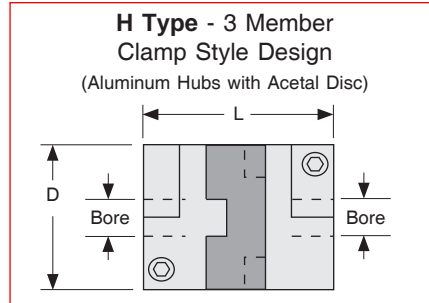
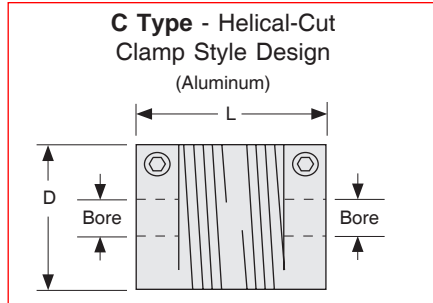


Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw (or belt) drive shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model Number	D inches (mm)	L inches (mm)	Table	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
				Motor	Minimum (in) (mm)	Maximum (in) (mm)					
C100-312-aaa	1.00 (25,4)	1.50 (38,1)	312	aaa	.250 6	.375 10	1.5 (43)	.19 (35)	23.0 (0,9)	400 (2,8)	
C125-312-aaa ⁽¹⁾	1.25 (31,8)	2.00 (50,8)	312	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)	
H100-312-aaa	1.00 (25,4)	1.28 (32,5)	312	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)	
H100-375-aaa	1.00 (25,4)	1.28 (32,5)	375	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)	
H131-312-aaa ⁽¹⁾	1.31 (33,3)	1.89 (48,0)	312	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)	
H131-375-aaa	1.31 (33,3)	1.89 (48,0)	375	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)	
H163-375-aaa ⁽²⁾	1.63 (41,4)	2.00 (50,8)	375	aaa	.375 10	.750 20	5.4 (153)	1.79 (328)	1.2 (0,047)	2,000 (14,1)	
G100-312-aaa	0.99 (25,2)	1.26 (32,0)	312	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)	
G100-375-aaa	0.99 (25,2)	1.26 (32,0)	375	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)	
G126-312-aaa	1.26 (32,1)	1.62 (41,0)	312	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)	
G126-375-aaa	1.26 (32,1)	1.62 (41,0)	375	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)	
G158-375-aaa ⁽²⁾	1.58 (40,2)	1.85 (47,0)	375	aaa	.375 10	.750 20	4.3 (120)	1.34 (245)	0.2 (0,008)	2,400 (17,0)	
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch	750 = .750 inch	005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm	012 = 12 mm 014 = 14 mm 016 = 16 mm 018 = 18 mm	019 = 19 mm 020 = 20 mm						

Footnotes:

- (1) This coupling option can not be used with the optional NEMA 23 motor mount for the 100 & 110 series because its length is too long. However, this coupling option can be used with the optional NEMA 34 motor mount. Custom motor mounts can be provided upon request. See page C-41 for more details.
- (2) This coupling option can not be used with the optional NEMA 23 motor mount for the 120 series because its diameter is too big. However, this coupling option can be used with the optional NEMA 34 motor mount. Custom motor mounts can be provided upon request. See page C-41 for more details.

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

Specification	100 & 110 Series	100 & 110 Series	120 Series	120 Series
	NEMA 23 bracket	NEMA 34 bracket	NEMA 23 bracket	NEMA 34 bracket
	inches (mm)	inches (mm)	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.312 (7,92)	0.312 (7,92)	0.375 (9,53)	0.375 (9,53)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)	1.500 (38,10)	2.000 (50,80)
Maximum coupling length	1.750 (44,45)	2.250 (57,15)	1.900 (48,26)	2.375 (60,32)

Note: Custom brackets available upon request.

Coupling Part Numbers

C020 C100-312-250
C021 C100-312-375
C022 C100-312-006
C023 C100-312-008
C024 C100-312-010

C040 C125-312-250
C041 C125-312-375
C042 C125-312-500
C043 C125-312-006
C044 C125-312-008
C045 C125-312-010
C046 C125-312-012
C047 C125-312-014

C125 H100-312-250
C126 H100-312-375
C127 H100-312-006
C128 H100-312-008
C129 H100-312-010

C130 H100-375-250
C131 H100-375-375
C132 H100-375-006
C133 H100-375-008
C134 H100-375-010

C145 H131-312-250
C146 H131-312-375
C147 H131-312-500
C148 H131-312-625
C149 H131-312-006
C150 H131-312-008
C151 H131-312-010
C152 H131-312-012
C153 H131-312-014
C154 H131-312-016

C155 H131-375-250
C156 H131-375-375
C157 H131-375-500
C158 H131-375-625
C159 H131-375-006
C160 H131-375-008
C161 H131-375-010
C162 H131-375-012
C163 H131-375-014
C164 H131-375-016

C190 H163-375-375
C191 H163-375-500
C192 H163-375-625
C193 H163-375-750
C194 H163-375-010
C195 H163-375-012
C196 H163-375-014
C197 H163-375-016
C198 H163-375-018
C199 H163-375-019
C200 H163-375-020

C400 G100-312-250
C401 G100-312-375
C402 G100-312-500
C403 G100-312-006
C404 G100-312-008
C405 G100-312-010
C406 G100-312-012

C407 G100-375-250
C408 G100-375-375
C409 G100-375-500
C410 G100-375-006
C411 G100-375-008
C412 G100-375-010
C413 G100-375-012

C425 G126-312-250
C426 G126-312-375
C427 G126-312-500
C428 G126-312-625
C429 G126-312-006
C430 G126-312-008
C431 G126-312-010
C432 G126-312-012
C433 G126-312-014
C434 G126-312-016

C435 G126-375-250
C436 G126-375-375
C437 G126-375-500
C438 G126-375-625
C439 G126-375-006
C440 G126-375-008
C441 G126-375-010
C442 G126-375-012
C443 G126-375-014
C444 G126-375-016

C470 G158-375-375
C471 G158-375-500
C472 G158-375-625
C473 G158-375-750
C474 G158-375-010
C475 G158-375-012
C476 G158-375-014
C477 G158-375-016
C478 G158-375-018
C479 G158-375-019
C480 G158-375-020

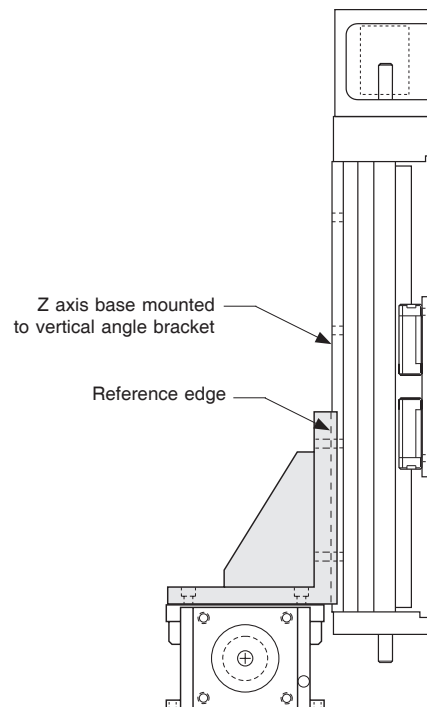
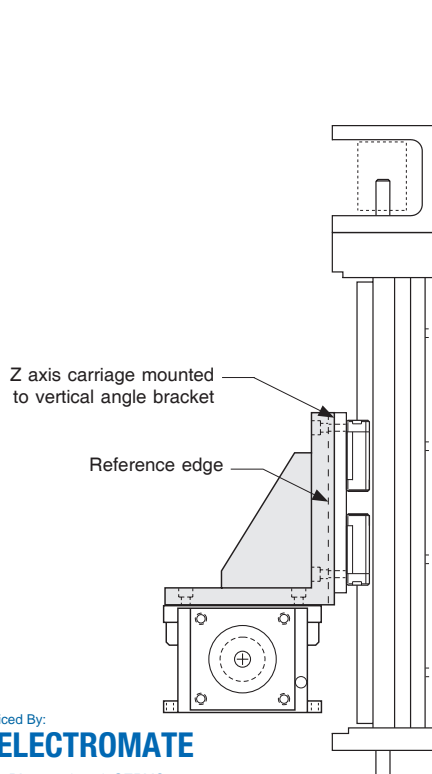
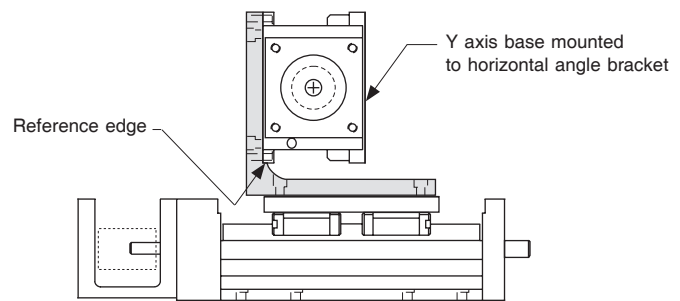
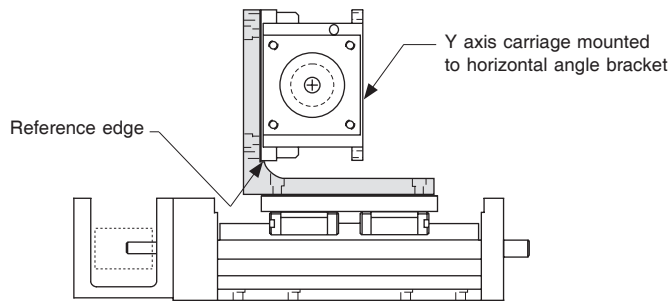
Horizontal & Vertical Angle Brackets

LINTECH has provided a simple solution for those applications requiring multiple axis positioning. Two different angle brackets (a horizontal mount and a vertical mount) provide for X-Y, X-Z, and X-Y-Z configurations. These angle brackets are used to mount single axis tables together in order to form multiple axis configurations, or to orient the single axis table in a different plane of motion.

These precision machined aluminum angle brackets ensure that the orthogonality of the two tables is maintained to < 30 arc-seconds. To achieve this orthogonality, one side of the angle bracket must be mounted to the table carriage with a precision square tool or micrometer depth gauge, while the

second axis is mounted securely against the reference edge of the angle bracket. The angle bracket hole pattern is pre-engineered for easy mounting of either the table carriage or table base.

When ordered, the angle bracket is shipped separately from the tables. The user is required to assemble the angle bracket to the tables. However, if requested, *LINTECH* can pre-assemble the multiple axis system before shipping. Anytime an angle bracket is used for multiple axis configurations, moment loads will result on one or more axes. Be sure to review moment loads, and the positioning table life, for your application.



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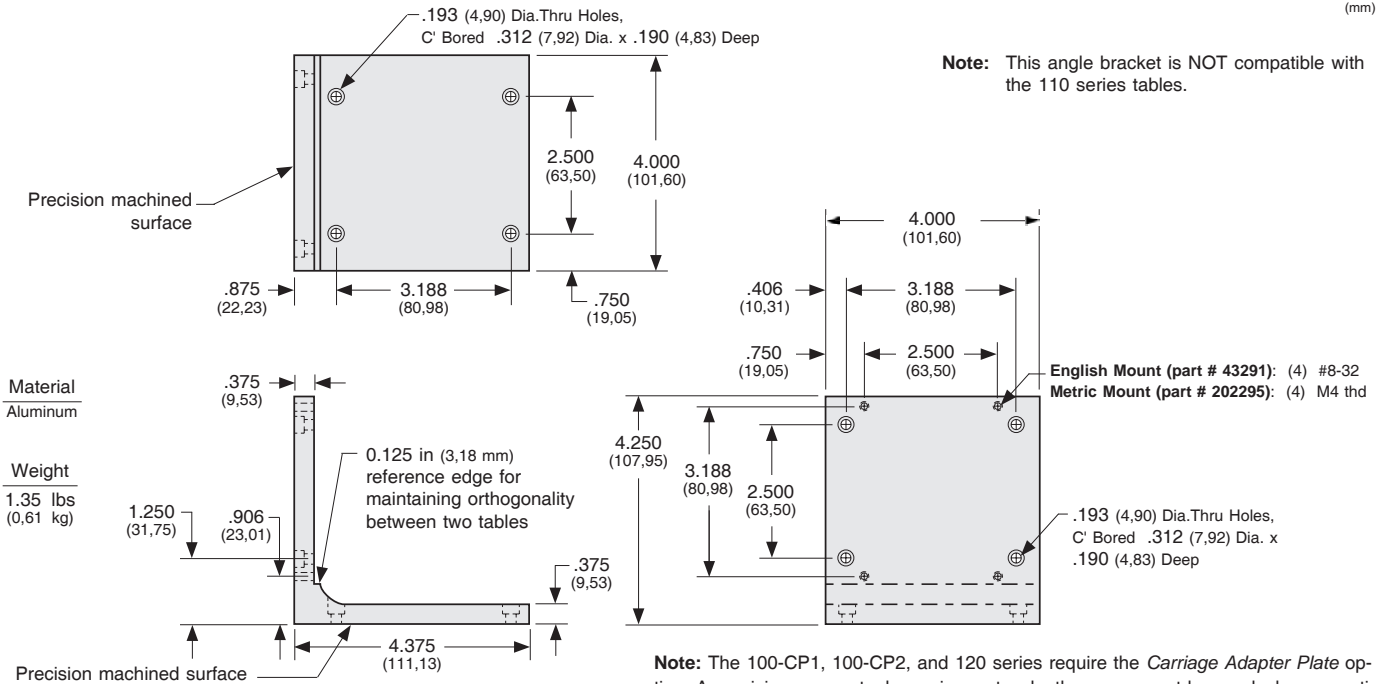
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Specifications subject to change without notice

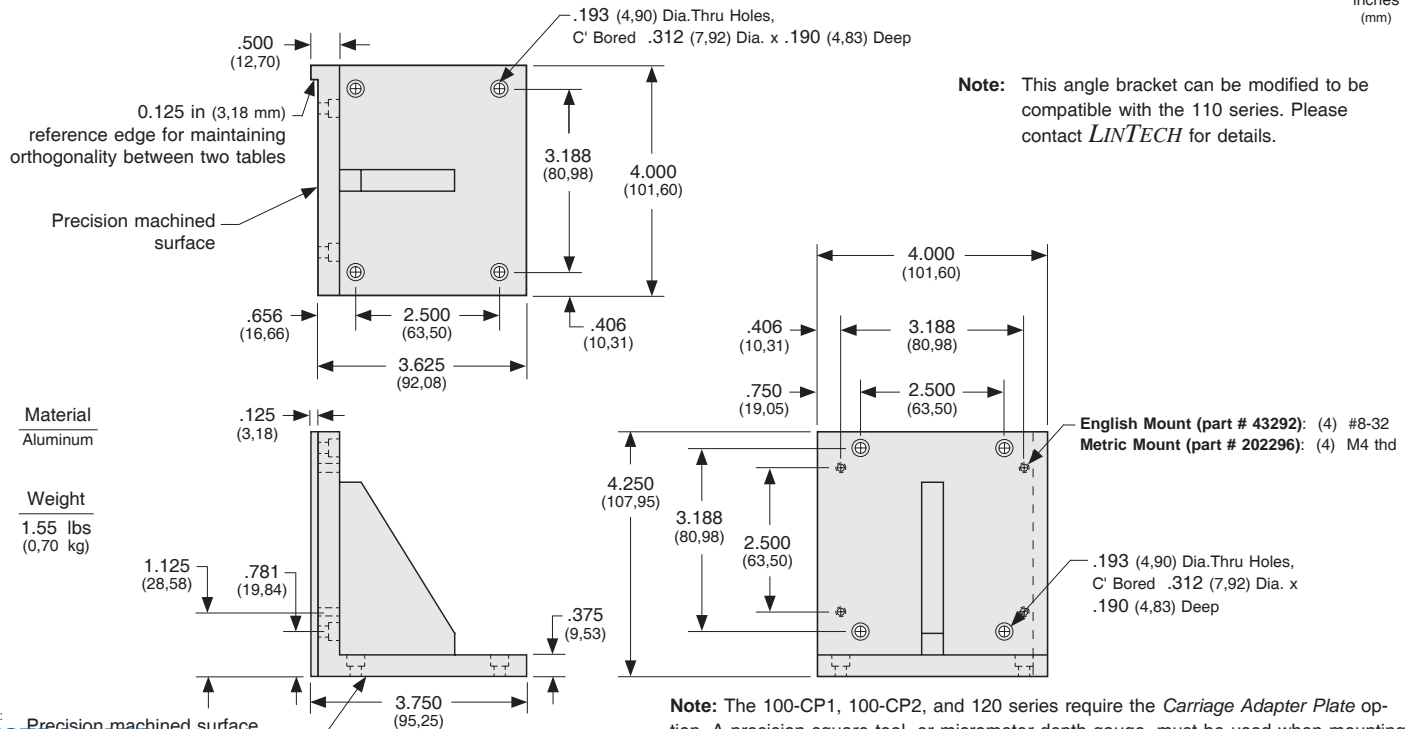
Horizontal Angle Bracket

inches
(mm)



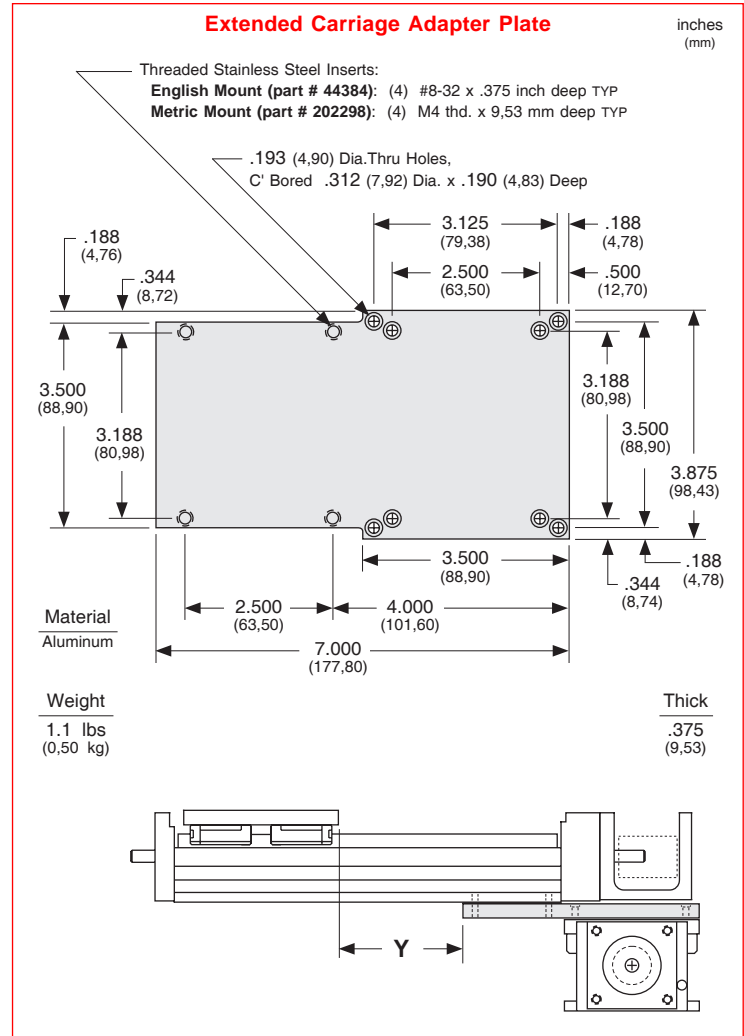
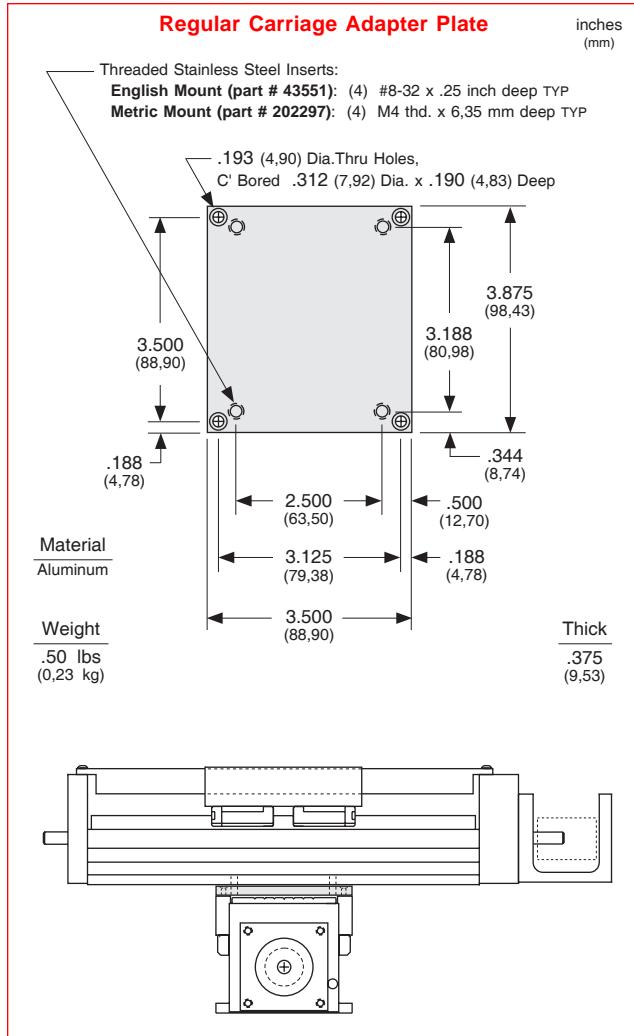
Vertical Angle Bracket

inches
(mm)



Carriage Adapter Plates

Optional carriage adapter plates assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. The regular carriage adapter plate can be used by either the 100-CP1, 100-CP2, or 120 series tables, while the extended adapter plate can be used with the 100, 110, or 120 series tables. The extended carriage adapter plate can be used in applications to increase the Y axis travel without having to use a longer travel table. A precision square tool, or micrometer depth gauge, is required in order to obtain an orthogonality between the two tables of < 30 arc-seconds.



Notes:

(1) Above **Y** travel distance (need to refer to Base Mounting Dimensions on pages C-6, C-8, C-10, C-14 & C-28):

For **D** dimension = 2.50 inches (63,5 mm): $Y = [\text{table travel length}] - [\text{C dimension}] + [0.50 \text{ inches (12,7 mm)}]$

For **D** dimension < 2.50 inches (63,5 mm): $Y = [\text{table travel length}] - [\text{C dimension}] - [\text{D dimension}] + [0.50 \text{ inches (12,7 mm)}]$

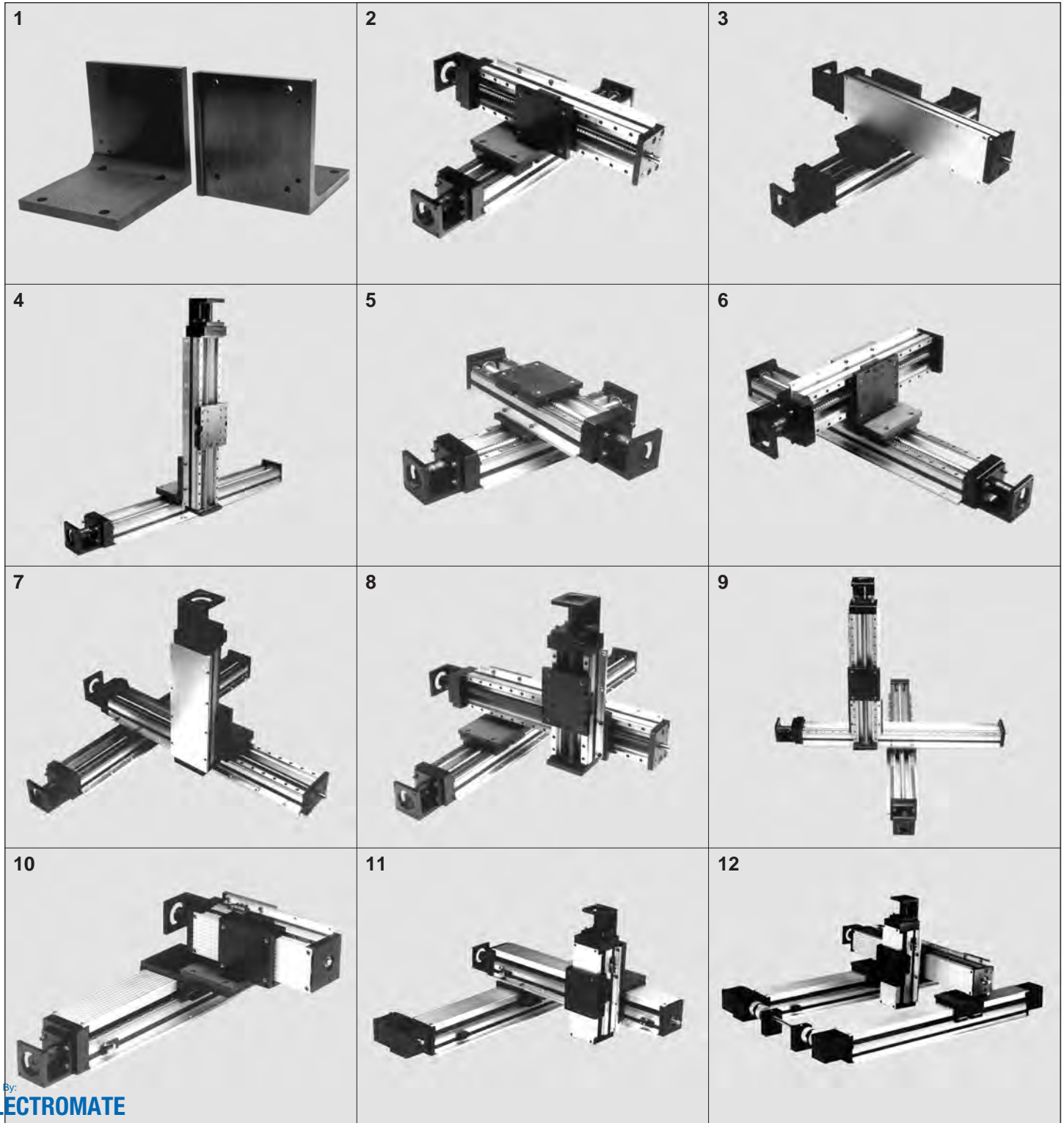
* Subtract an additional 0.875 inches (22,22 mm) from the above values if a 110 series table is used as the bottom axis.

* If a 110 series table is used as the top axis, the **Y** travel distance is the same as the 110 series table travel due to the waycovers.

* The extended carriage adapter plate works with all top axis tables that use the optional NEMA 23 motor mount. Care should be taken if the optional NEMA 34 motor mount, or any other motor mount is used on the top axis table. The motor mount could extend below the table base, thus interfering with the extended carriage adapter plate.

Multiple Axis Configurations

With *LINTECH*'s uniquely designed angle brackets & carriage adapter plates, along with the symmetrical base mounting hole pattern & carriage insert pattern of the 100 and 120 series positioning tables, numerous X-Y, X-Z, and X-Y-Z configurations are possible. The 100-CP1, 100-CP2, and 120 series tables require the use of a "Carriage Adapter Plate". The increased width of the 110 (waycover) series prohibits the use of the horizontal and vertical angle brackets with these positioning tables.

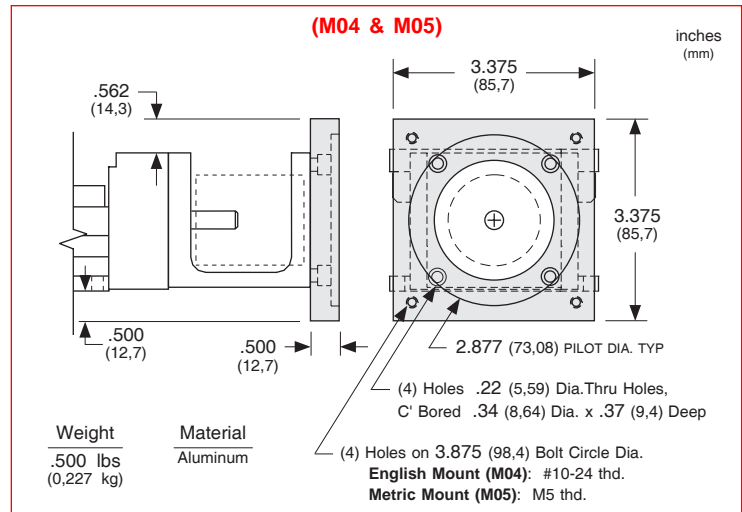


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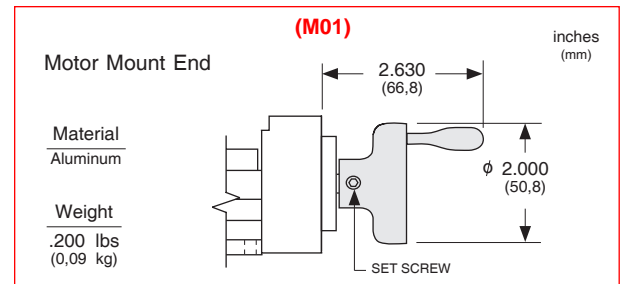
NEMA 34 Motor Mount for 100 & 110 Series

The NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



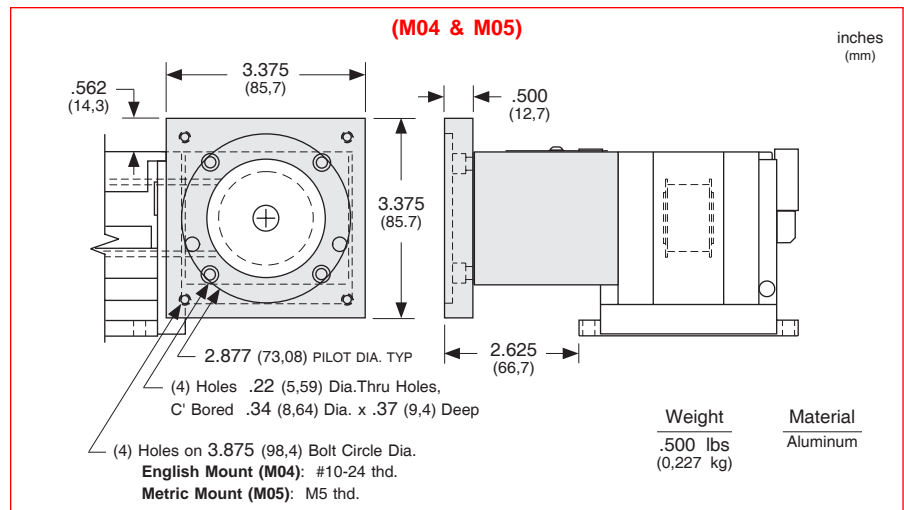
Hand Crank for 100 & 110 Series

For manually operated applications, *LINTECH* provides a hand crank option for the 100 & 110 table series. The hand crank replaces the motor mount and coupling on the table.



NEMA 34 Motor Mount for 120 Series

The 120 series positioning table can be provided with an optional NEMA 34 motor adapter bracket. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



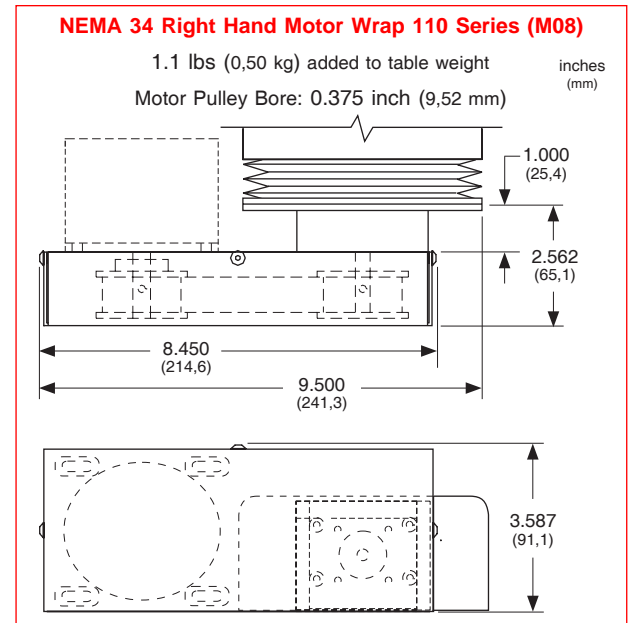
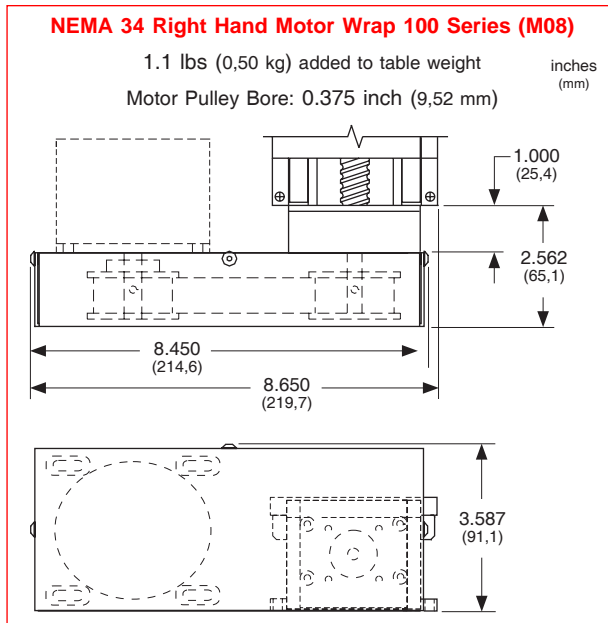
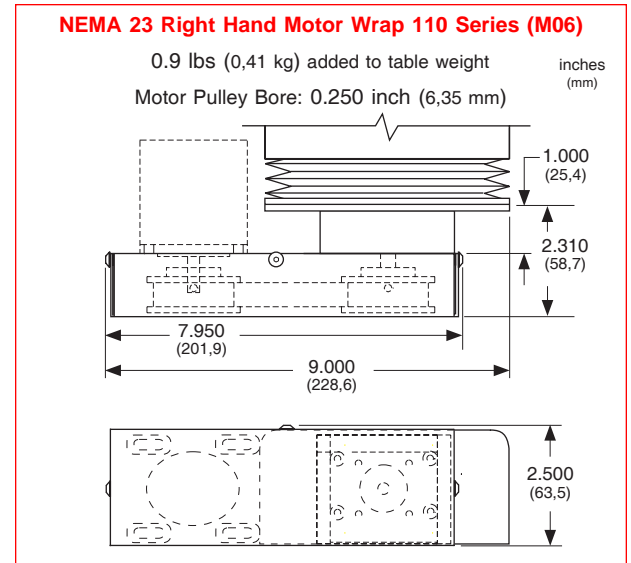
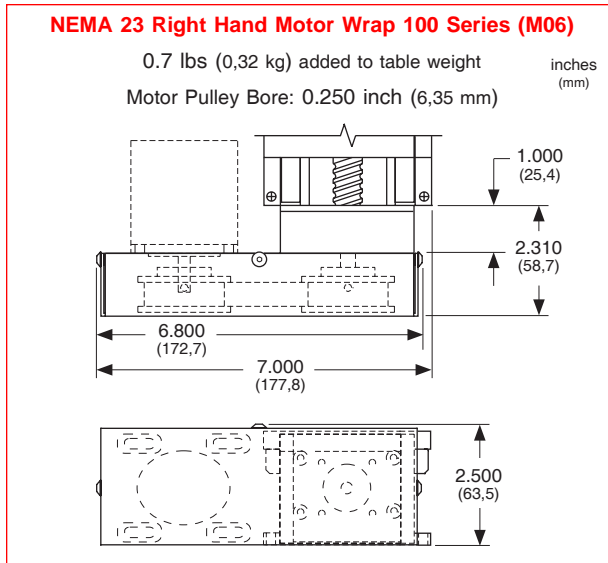
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Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages for 100 & 110 Series

For space limited 100 & 110 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 23	1.65 (41,9)	7.5 (0,21)	1.65 (41,9)	7.5 (0,21)	1.0 (0,028)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)

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Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores MUST be specified for non-NEMA motors.

Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 100 or 110 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. The 120 series will have the brake mounted to the thru drive shaft option. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

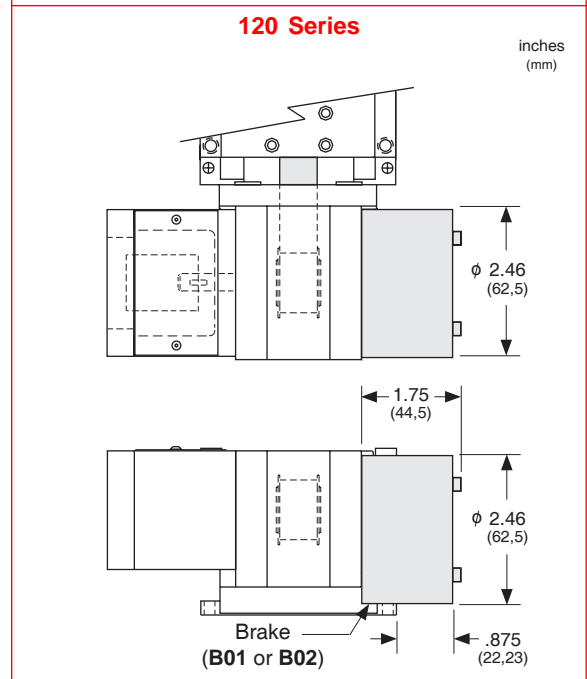
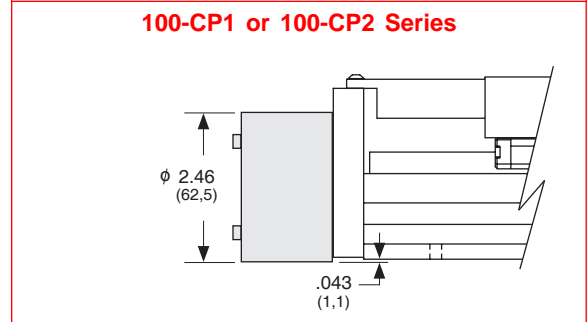
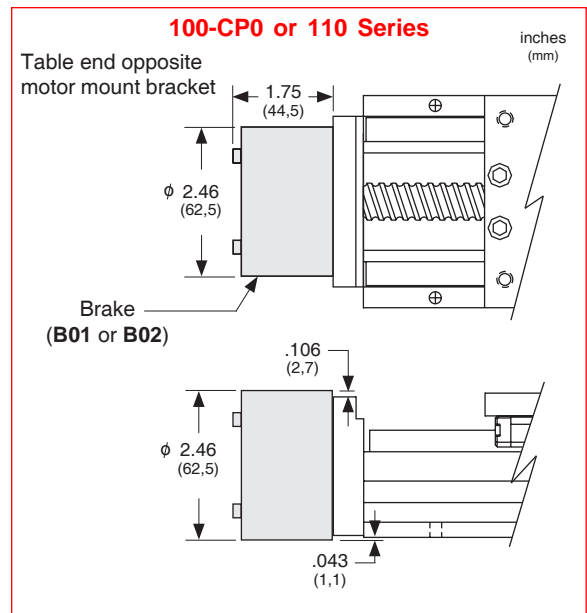
Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

Power Supplies

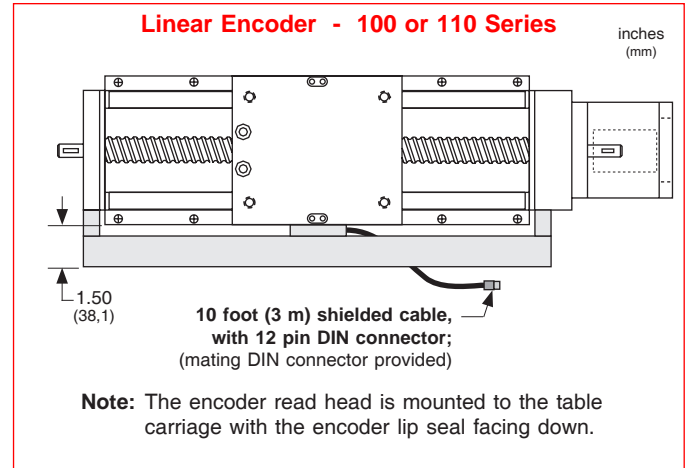
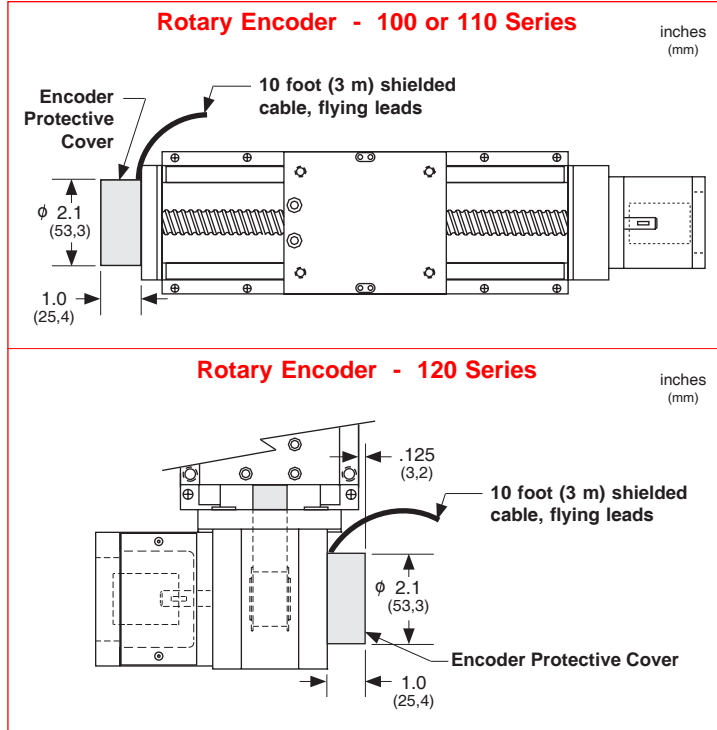
Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60



Linear & Rotary Incremental Encoders

Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 100 or 110 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 100, 110 or 120 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.

LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

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90 Series Positioning Tables



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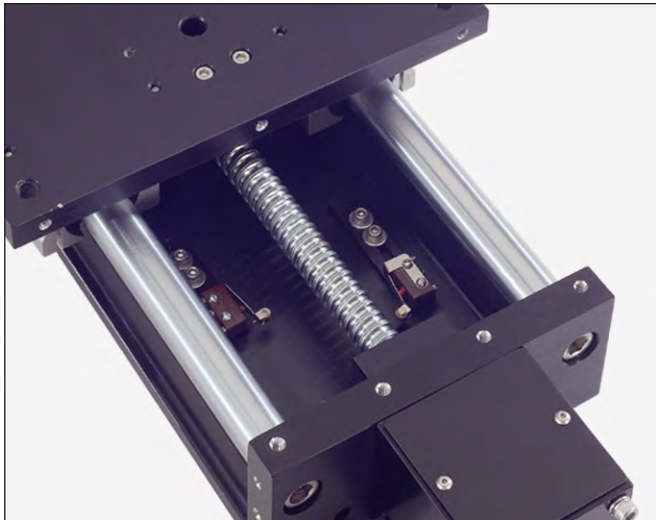
Single or Multiple Axis

LINTECH's 90 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 90 series tables are designed with a low friction, preloaded, recirculating linear ball bearing system, which rides on a precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 50 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 90 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Vertical Angle Brackets

Optional vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Waycovers

For operator protection, these tables can be fitted with a protective bellows. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 90 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 90 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

Other

The 90 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

Standard Features - 90 Series

- ❑ Compact 8.0 inches (203 mm) wide by 2.930 inches (74 mm) tall
- ❑ Travel lengths from 6 inches (150 mm) to 60 inches (1520 mm)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ 0° F to +185° F (-18° C to +85° C) operating temperature
- ❑ 2 rail, 4 bearing, 6 & 12 inch long carriages
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground round rail design

90-WC0 Series



90-WC1 Series



Options - 90 Series

- ❑ Chrome plated linear bearings, rails and screws
- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via the internet
- ❑ Adapter brackets for non-NEMA motors
- ❑ Linear and rotary incremental encoders
- ❑ NEMA 23 & 34 motor wrap packages
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Vertical angle bracket
- ❑ Turcite nut option
- ❑ Motor couplings
- ❑ Hand crank

- ❑ Ball screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 0.625 inch diameter, 1.000 inch lead
- 0.750 inch diameter, 0.200 inch lead
- 0.750 inch diameter, 0.500 inch lead
- 1.000 inch diameter, 0.250 inch lead
- 1.000 inch diameter, 0.500 inch lead
- 1.000 inch diameter, 1.000 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 10 mm lead
- 16 mm diameter, 16 mm lead
- 0.750 inch diameter, 0.200 inch lead
- 20 mm diameter, 5 mm lead
- 20 mm diameter, 20 mm lead

Ground - Preloaded Nuts Only:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 16 mm lead

- ❑ Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.100 inch lead
- 0.625 inch diameter, 0.200 inch lead

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9 06 06 - WC0 - 1 - S005 - M02 - C155 - L01 - E00 - B00

Table Series

Carriage Length

06 - 6 inches **12** - 12 inches

Travel Length (see pages D-6 & D-8)

06 - 6 to 60 inches

Waycovers

WC0 - with no waycovers **WC1** - with waycovers

Carriage Inserts (see pages D-7 & D-9)

1 - English mount **2** - Metric mount

Screw Options (see pages D-18 to D-25)

<i>Rolled ball screws</i>	<i>Rolled ball screws</i>	<i>Precision ball screws</i>
S005 - .625 x .200 NPL	S021 - 1.000 x .250 NPL	S114 - .625 x .200 NPL
S006 - .625 x .200 PL	S022 - 1.000 x .250 PL	S115 - .625 x .200 PL
S007 - .625 x .200 NPL(T)	S023 - 1.000 x .250 NPL(T)	S116 - 16 x 5 NPL
S008 - .625 x .200 PL(T)	S024 - 1.000 x .250 PL(T)	S117 - 16 x 5 PL
S009 - .625 x 1.000 NPL	S025 - 1.000 x .500 NPL	S118 - 16 x 10 NPL
S010 - .625 x 1.000 PL	S026 - 1.000 x .500 PL	S119 - 16 x 10 PL
S011 - .625 x 1.000 NPL(T)	S027 - 1.000 x .500 NPL(T)	S120 - 16 x 16 NPL
S012 - .625 x 1.000 PL(T)	S028 - 1.000 x .500 PL(T)	S121 - 16 x 16 PL
S013 - .750 x .200 NPL	S029 - 1.000 x 1.000 NPL	S122 - .750 x .200 NPL
S014 - .750 x .200 PL	S030 - 1.000 x 1.000 PL	S123 - .750 x .200 PL
S015 - .750 x .200 NPL(T)	S031 - 1.000 x 1.000 NPL(T)	S124 - 20 x 5 NPL
S016 - .750 x .200 PL(T)	S032 - 1.000 x 1.000 PL(T)	S125 - 20 x 5 PL
S017 - .750 x .500 NPL		S128 - 20 x 20 NPL
S018 - .750 x .500 PL	<i>Ground ball screws</i>	S129 - 20 x 20 PL
S019 - .750 x .500 NPL(T)	S212 - .625 x .200 PL	
S020 - .750 x .500 PL(T)	S213 - .625 x .500 PL	<i>Rolled acme screws</i>
	S214 - 16 x 5 PL	S300 - .625 x .100 NPL
	S215 - 16 x 16 PL	S301 - .625 x .100 PL
S999 - other		S302 - .625 x .200 NPL
		S303 - .625 x .200 PL

Motor Mount (see pages D-7 & D-9, D-28 to D-29)

M00 - none	M02 - NEMA 23 mount (E)	M07 - NEMA 23 (LH) wrap
M01 - hand crank	M03 - NEMA 23 mount (M)	M08 - NEMA 34 (RH) wrap
	M04 - NEMA 34 mount (E)	M09 - NEMA 34 (LH) wrap
M99 - other	M05 - NEMA 34 mount (M)	M12 - NEMA 42 (RH) wrap
	M06 - NEMA 23 (RH) wrap	M13 - NEMA 42 (LH) wrap

Coupling Options (see pages D-26 to D-27)

C000 - none	C025 to C029 - C100	C130 to C134 - H100	C407 to C413 - G100
C999 - other	C048 to C055 - C125	C155 to C164 - H131	C435 to C444 - G126

Limit & Home Switches (see pages D-15 to D-17)

L00 - no switches		Mechanical	Reed	Hall	Prox (NPN)	Prox (PNP)
L99 - other	EOT & home switches	L01	L04	L07	L10	L13
	EOT switches only	L02	L05	L08	L11	L14
	home switch only	L03	L06	L09	L12	L15

Encoder Options (see page D-31)

E00 - none	E02 - rotary (1000 lines/rev)	E10 - linear (2500 lines/inch)	E99 - other
E01 - rotary (500 lines/rev)	E03 - rotary (1270 lines/rev)	E11 - linear (125 lines/mm)	

Power-off Brakes (see page D-30)

B00 - none	B01 - 24 VDC	B02 - 90 VDC	B99 - other
-------------------	---------------------	---------------------	--------------------

(E) - English Interface (NPL) - Non Preloaded
 (LH) - Left Hand (PL) - Preloaded
 (M) - Metric Interface (RH) - Right Hand
 (T) - Turcite Nut

Specifications

Load Capacities		6 inch (4 bearing) Carriage		12 inch (4 bearing) Carriage	
Dynamic Horizontal ⁽¹⁾	2 million inches (50 km) of travel	3,300 lbs	(1496 kg)	3,300 lbs	(1496 kg)
Dynamic Horizontal ⁽¹⁾	50 million inches (1270 km) of travel	1,125 lbs	(510 kg)	1,125 lbs	(510 kg)
Static Horizontal ⁽¹⁾		5,000 lbs	(2268 kg)	5,000 lbs	(2268 kg)
Dynamic Roll Moment ⁽¹⁾	2 million inches (50 km) of travel	380 ft-lbs	(515 N-m)	380 ft-lbs	(515 N-m)
Dynamic Roll Moment ⁽¹⁾	50 million inches (1270 km) of travel	130 ft-lbs	(176 N-m)	130 ft-lbs	(176 N-m)
Static Roll Moment ⁽¹⁾		575 ft-lbs	(780 N-m)	575 ft-lbs	(780 N-m)
Dyn. Pitch & Yaw Moment ⁽¹⁾	2 million inches (50 km) of travel	150 ft-lbs	(203 N-m)	525 ft-lbs	(712 N-m)
Dyn. Pitch & Yaw Moment ⁽¹⁾	50 million inches (1270 km) of travel	51 ft-lbs	(69 N-m)	179 ft-lbs	(243 N-m)
Static Pitch & Yaw Moment ⁽¹⁾		225 ft-lbs	(305 N-m)	790 ft-lbs	(1071 N-m)
Each Bearing Dyn. Cap. ⁽¹⁾	2 million inches (50 km) of travel	825 lbs	(374 kg)	825 lbs	(374 kg)
Each Bearing Dyn. Cap. ⁽¹⁾	50 million inches (1270 km) of travel	282 lbs	(128 kg)	282 lbs	(128 kg)
Each Bearing Static Load Capacity ⁽¹⁾		1,250 lbs	(567 kg)	1,250 lbs	(567 kg)
Thrust Force Capacity	10 million screw revolutions	895 lbs	(406 kg)	895 lbs	(406 kg)
Thrust Force Capacity	500 million screw revolutions	240 lbs	(109 kg)	240 lbs	(109 kg)
Maximum Acceleration		772 in/sec ²	(19,6 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	4.500 in	(114,3 mm)	4.500 in	(114,3 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	2.500 in	(63,5 mm)	8.620 in	(218,9 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.437 in	(36,5 mm)	1.437 in	(36,5 mm)

Other	For Six (6) & Twelve (12) inch Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages D-18 to D-25)	Acme Screw - Stainless Steel
Screw Material (see pages D-18 to D-25)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00016 in/in (< 4,06 microns/25mm)
Flatness	< 0.00016 in/in (< 4,06 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows firmly mounted to carriage & end plates

Footnotes:

(1) Derate value by 50 % when load is applied to the open end of the bearing (such as in moment loads and inverted configurations).

Dimensions & Specifications

- Without Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	E	M		
90606-WC0	6 (150)	13.25 (336,5)	15.75 (400,0)	10.00 (254,0)	6.00 (152,4)	4.00 (101,6)	6	14.94 (379,4)	13.3 (6,0)
90612-WC0	12 (300)	19.25 (488,9)	21.75 (552,4)	16.00 (406,4)	See Detail 1		8	20.94 (531,9)	16.8 (7,6)
90618-WC0	18 (455)	25.25 (641,3)	27.75 (704,8)	22.00 (558,8)	See Detail 2		10	26.94 (684,3)	20.0 (9,1)
90624-WC0	24 (605)	31.25 (793,7)	33.75 (857,2)	28.00 (711,2)	See Detail 3		14	32.94 (836,7)	31.0 (14,1)
90630-WC0	30 (760)	37.25 (946,1)	39.75 (1009,6)	34.00 (863,6)	See Detail 4		16	38.94 (989,1)	36.0 (16,3)
90636-WC0	36 (910)	43.25 (1098,5)	45.75 (1162,0)	40.00 (1016,0)	See Detail 5		18	44.94 (1141,5)	41.0 (18,6)
90648-WC0	48 (1215)	55.25 (1403,3)	57.75 (1466,8)	52.00 (1320,8)	See Detail 7		24	56.94 (1446,3)	51.0 (23,1)
90660-WC0	60 (1520)	67.25 (1708,1)	69.75 (1771,6)	64.00 (1625,6)	See Detail 9		28	68.94 (1751,1)	61.0 (27,7)
91206-WC0	6 (150)	19.25 (488,9)	21.75 (552,4)	16.00 (406,4)	See Detail 1		8	20.94 (531,9)	21.3 (9,7)
91212-WC0	12 (300)	25.25 (641,3)	27.75 (704,8)	22.00 (558,8)	See Detail 2		10	26.94 (684,3)	23.5 (10,7)
91218-WC0	18 (455)	31.25 (793,7)	33.75 (857,2)	28.00 (711,2)	See Detail 3		14	32.94 (836,7)	33.0 (15,0)
91224-WC0	24 (605)	37.25 (946,1)	39.75 (1009,6)	34.00 (863,6)	See Detail 4		16	38.94 (989,1)	38.0 (17,2)
91230-WC0	30 (760)	43.25 (1098,5)	45.75 (1162,0)	40.00 (1016,0)	See Detail 5		18	44.94 (1141,5)	43.0 (19,5)
91236-WC0	36 (910)	49.25 (1250,9)	51.75 (1466,8)	46.00 (1168,4)	See Detail 6		24	50.94 (1293,9)	48.0 (21,8)
91248-WC0	48 (1215)	61.25 (1555,7)	63.75 (1619,2)	58.00 (1473,2)	See Detail 8		28	62.94 (1598,7)	58.0 (26,3)
91260-WC0	60 (1520)	73.25 (1860,5)	75.75 (1924,0)	70.00 (1778,0)	See Detail 10		30	74.94 (1903,5)	68.0 (30,8)

{

 06 = Carriage length is 06 inch (152,4 mm) with 4 bearings; Carriage weight = 5.25 lbs. (2,38 kg)
 12 = Carriage length is 12 inch (304,8 mm) with 4 bearings; Carriage weight = 8.00 lbs. (3,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 1.000 inch diameter screw add 0.117 lbs per inch (0,0021 kg per mm) of screw length for a given model number.

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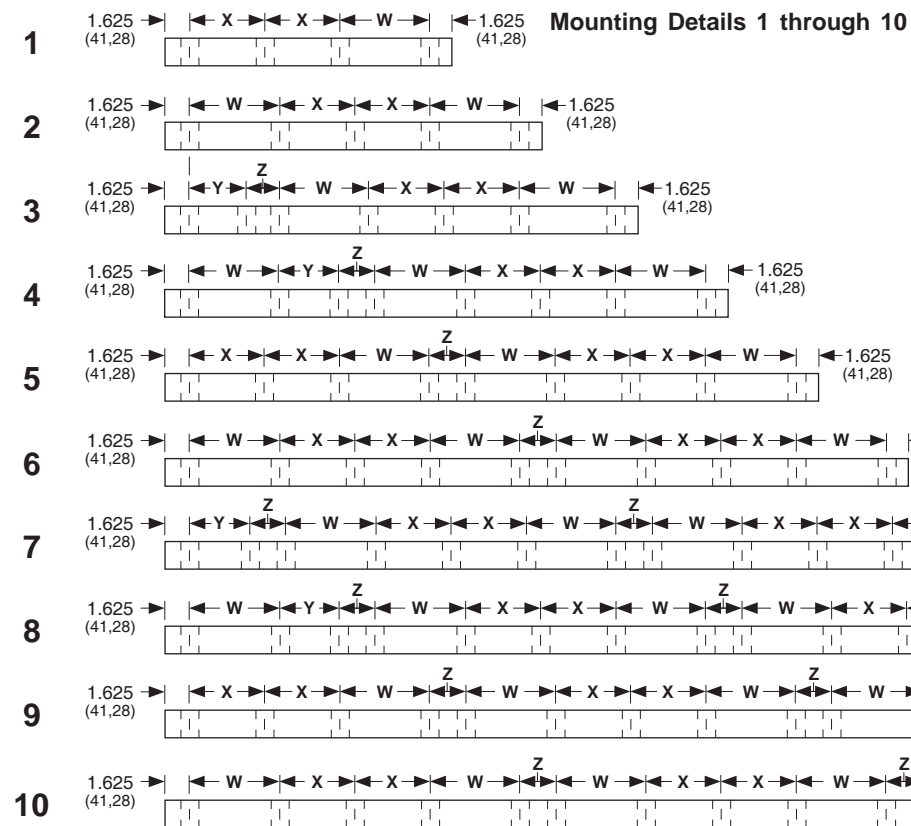
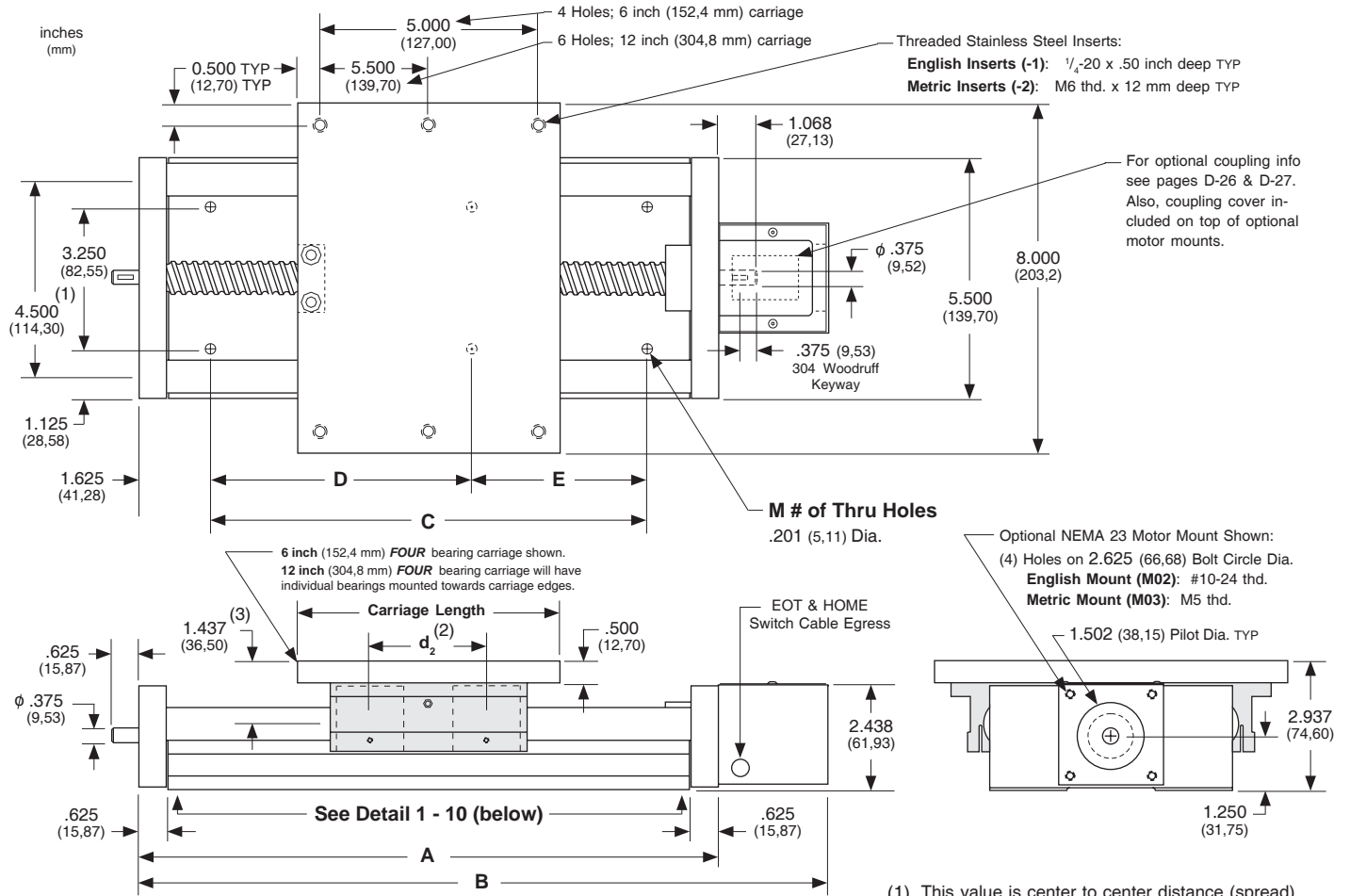
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Specifications Subject to Change Without Notice

Dimensions

- Without Waycovers -



- (1) This value is center to center distance (spread) between the two rails (d_1).
 - (2) This value is center to center distance (spacing) of the bearings on a single rail (d_2) [see page D-5].
 - (3) This value is center distance of the bearing to top of carriage plate surface (d_3).
- Note:** Any 90 series table can be mounted on top of any second 90 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Please contact *LINTECH*.

$W = 6.00$ (152,4)	$X = 5.00$ (127,0)
$Y = 4.00$ (101,6)	$Z = 2.00$ (50,8)

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)				Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	E	M		
90604-WC1	4.7 (119)	13.25 (336,5)	15.75 (400,0)	10.00 (254)	6.00 (152,4)	4.00 (101,6)	6	14.94 (379,4)	14.2 (6,5)
90609-WC1	9.7 (246)	19.25 (488,9)	21.75 (552,4)	16.00 (406,4)	See Detail 1		8	20.94 (531,9)	18.2 (8,3)
90614-WC1	14.8 (375)	25.25 (641,3)	27.75 (704,8)	22.00 (558,8)	See Detail 2		10	26.94 (684,3)	21.8 (9,9)
90619-WC1	19.8 (502)	31.25 (793,7)	33.75 (857,2)	28.00 (711,2)	See Detail 3		14	32.94 (836,7)	33.2 (15,1)
90624-WC1	24.9 (632)	37.25 (946,1)	39.75 (1009,6)	34.00 (863,6)	See Detail 4		16	38.94 (989,1)	38.6 (17,5)
90629-WC1	29.9 (759)	43.25 (1098,5)	45.75 (1162,0)	40.00 (1016,0)	See Detail 5		18	44.94 (1141,5)	44.0 (20,0)
90640-WC1	40.2 (1021)	55.25 (1403,3)	57.75 (1466,8)	52.00 (1320,8)	See Detail 7		24	56.94 (1446,3)	54.9 (24,9)
90650-WC1	50.2 (1275)	67.25 (1708,1)	69.75 (1771,6)	64.00 (1625,6)	See Detail 9		28	68.94 (1751,1)	65.7 (29,8)
91204-WC1	4.7 (119)	19.25 (488,9)	21.75 (552,4)	16.00 (406,4)	See Detail 1		8	20.94 (531,9)	22.3 (10,1)
91209-WC1	9.7 (246)	25.25 (641,3)	27.75 (704,8)	22.00 (558,8)	See Detail 2		10	26.94 (684,3)	24.9 (11,3)
91214-WC1	14.8 (375)	31.25 (793,7)	33.75 (857,2)	28.00 (711,2)	See Detail 3		14	32.94 (836,7)	34.8 (15,8)
91219-WC1	19.8 (502)	37.25 (946,1)	39.75 (1009,6)	34.00 (863,6)	See Detail 4		16	38.94 (989,1)	40.2 (18,2)
91224-WC1	24.9 (632)	43.25 (1098,5)	45.75 (1162,0)	40.00 (1016,0)	See Detail 5		18	44.94 (1141,5)	45.6 (20,7)
91229-WC1	29.9 (759)	49.25 (1250,9)	51.75 (1466,8)	46.00 (1168,4)	See Detail 6		24	50.94 (1293,9)	51.0 (23,1)
91240-WC1	40.2 (1021)	61.25 (1555,7)	63.75 (1619,2)	58.00 (1473,2)	See Detail 8		28	62.94 (1598,7)	61.9 (28,1)
91250-WC1	50.2 (1275)	73.25 (1860,5)	75.75 (1924,0)	70.00 (1778,0)	See Detail 10		30	74.94 (1903,5)	72.7 (33,0)

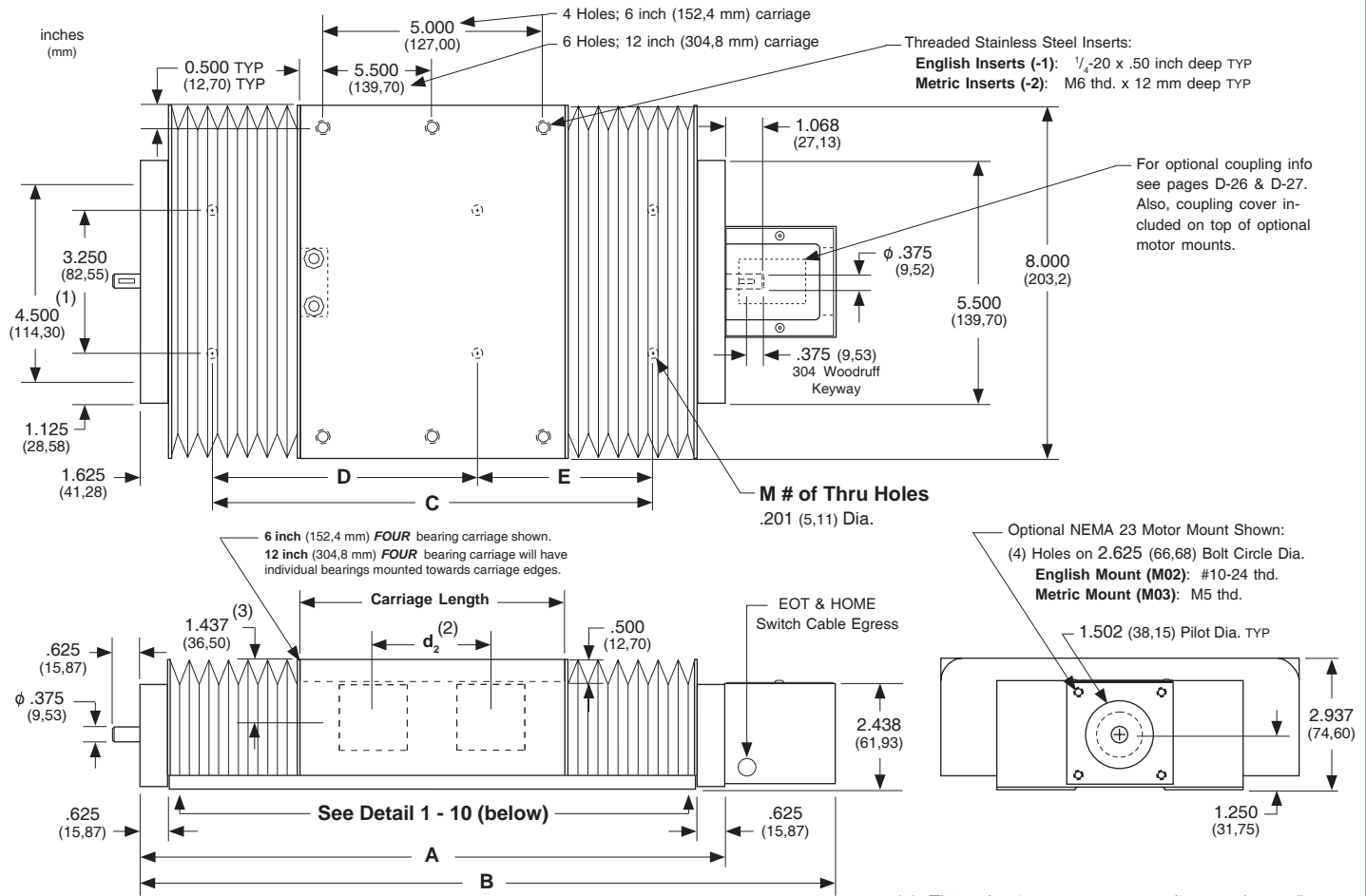
- 06 = Carriage length is 06 inch (152,4 mm) with 4 bearings; Carriage weight = 5.75 lbs. (2,61 kg)
- 12 = Carriage length is 12 inch (304,8 mm) with 4 bearings; Carriage weight = 8.75 lbs. (3,97 kg)

Footnotes:

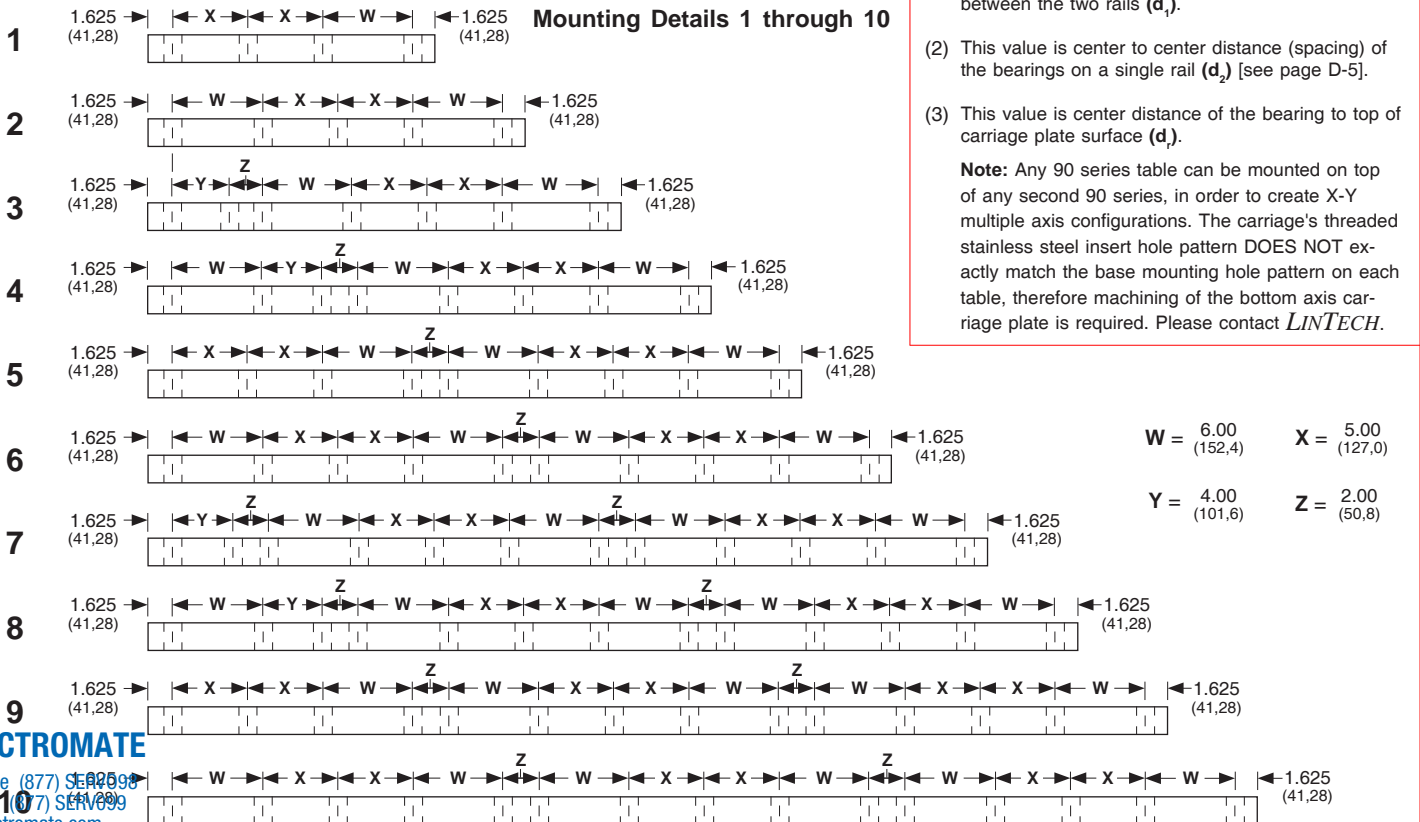
(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 1.000 inch diameter screw add 0.117 lbs per inch (0,0021 kg per mm) of screw length for a given model number.

Dimensions

- With Waycovers -



Mounting Details 1 through 10

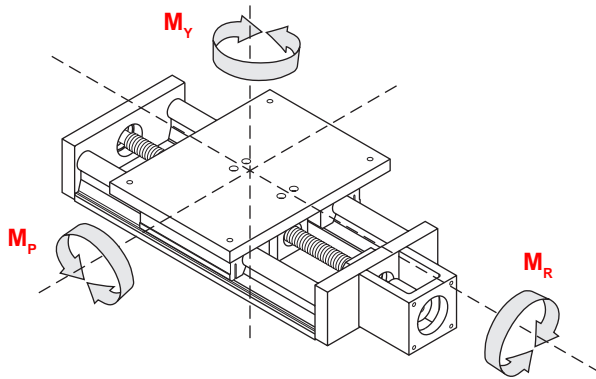


Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 90 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

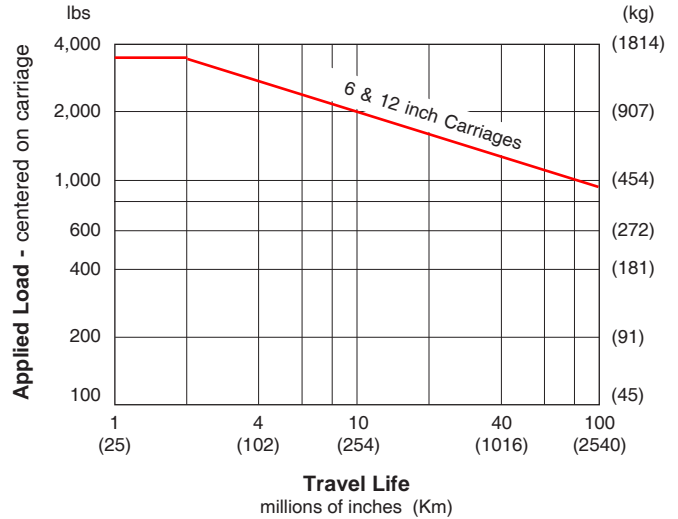
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		6 inch Carriage		12 inch Carriage	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	3,300	(1496)	3,300	(1496)
50	(1270)	1,125	(510)	1,125	(510)
100	(2540)	885	(401)	885	(401)

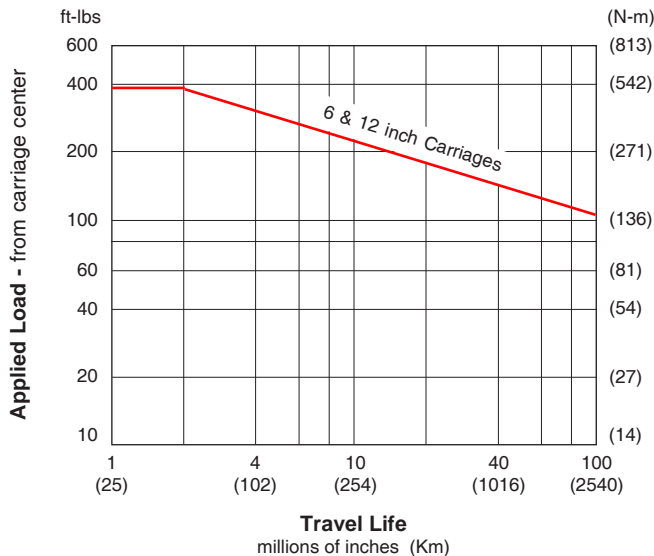


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		6 inch Carriage		12 inch Carriage	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	380	(515)	380	(515)
50	(1270)	130	(176)	130	(176)
100	(2540)	102	(138)	102	(138)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

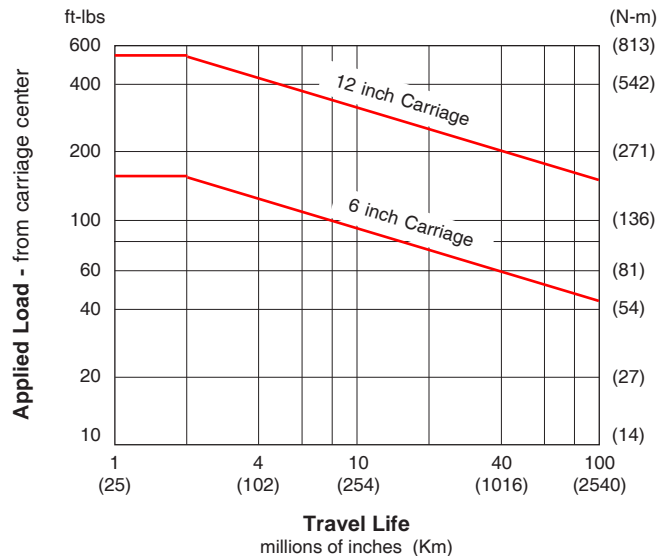


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		6 inch Carriage		12 inch Carriage	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	150	(203)	525	(712)
50	(1270)	51	(69)	179	(243)
100	(2540)	41	(55)	141	(191)

Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page D-12 for load/life capacity of the screw end support bearings.

Horizontal Application

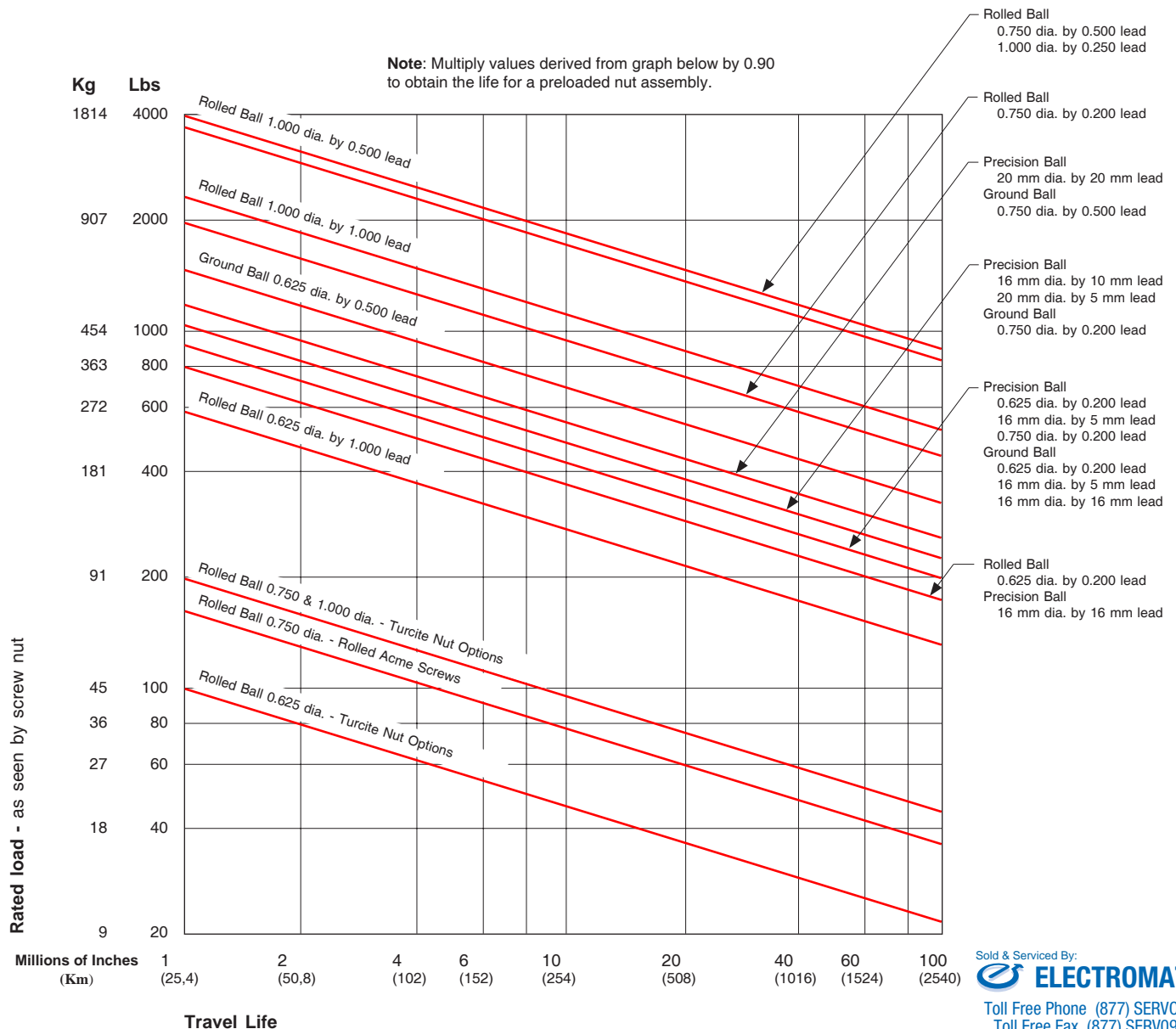
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages D-21 to D-25)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)



Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page D-11 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

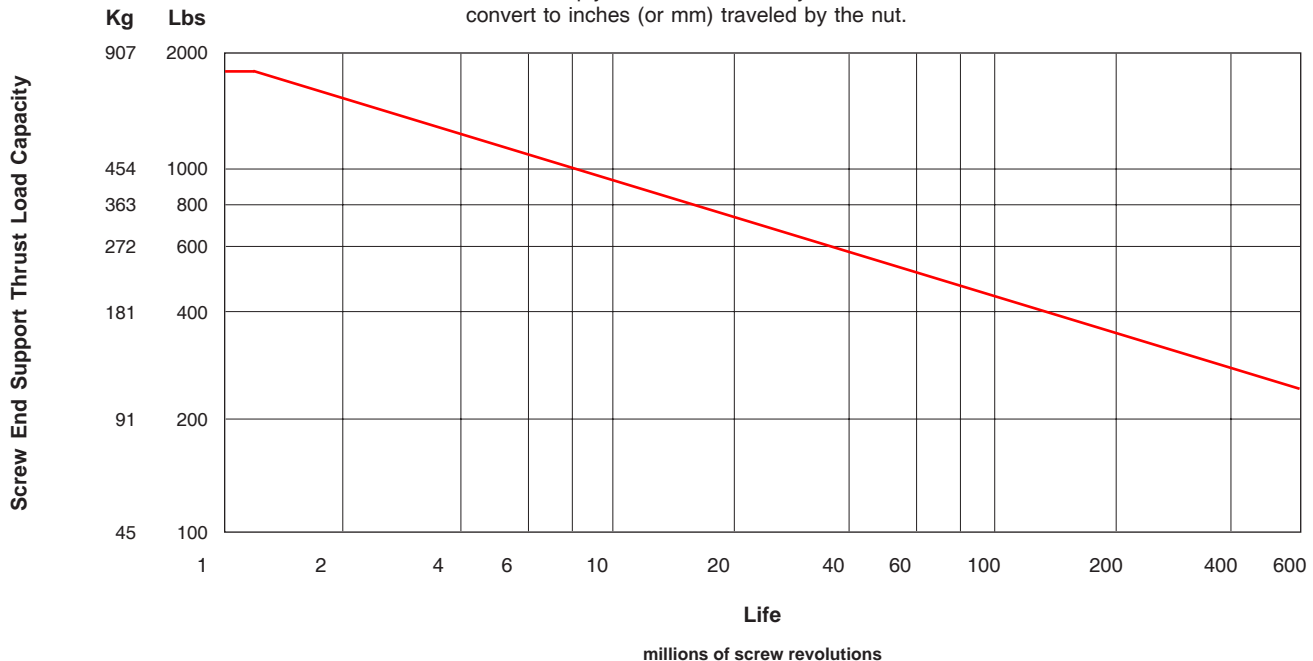
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions						
		millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	1,725 (782)	1,725 (782)	1,530 (694)	895 (406)	525 (238)	415 (188)	240 (109)

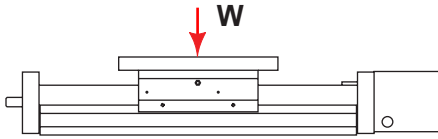
Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



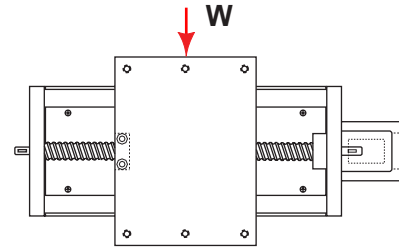
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$I = 0.28 \text{ in}^4 \text{ (} 1.16 \times 10^5 \text{ mm}^4 \text{)}$

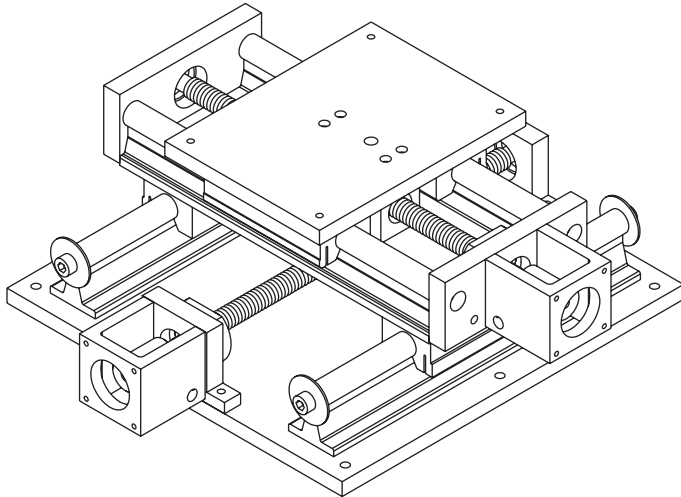
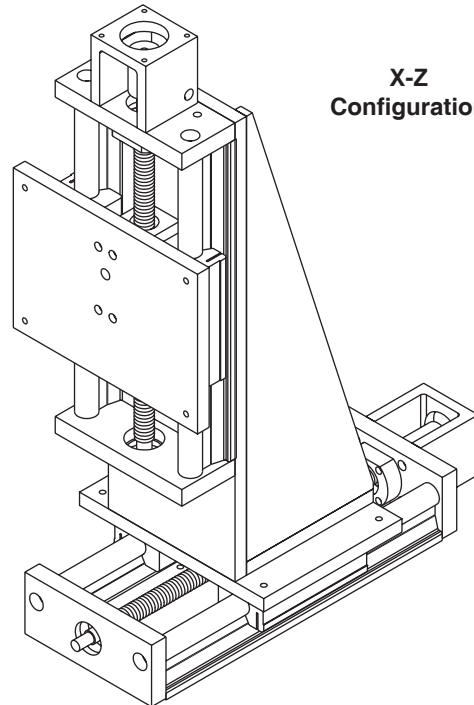
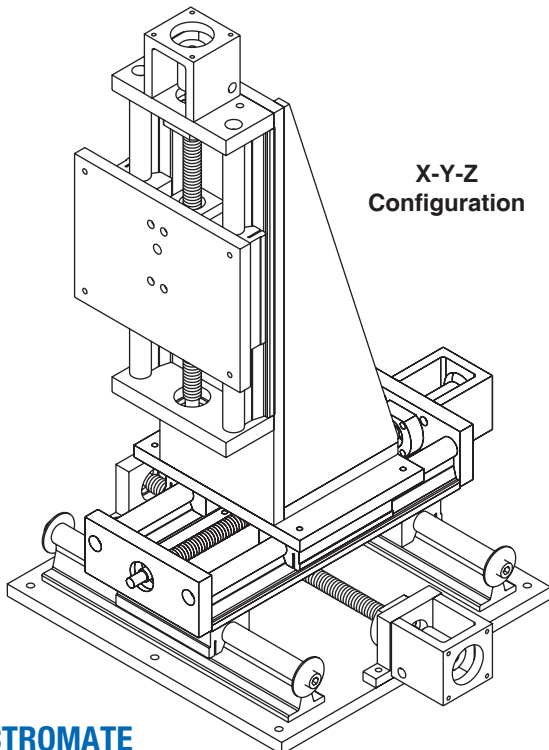


$I = 4.81 \text{ in}^4 \text{ (} 20.00 \times 10^5 \text{ mm}^4 \text{)}$



Multi-Axis Configurations

LINTECH can provide various adapter plates, and vertical adapter brackets, to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations. There are literally hundreds of different possible configurations available. See below for some of the more common systems. *LINTECH* has a great deal of experience in dealing with multiple axis configurations. Sometimes different standard table series can be mounted together to form a custom system. Other times, a complete custom assembly is created, due to the application details. Contact *LINTECH* for more information.

X-Y
ConfigurationX-Z
ConfigurationX-Y-Z
Configuration

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Specifications Subject to Change Without Notice

End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 90 series table, each switch is mounted to the base of the table, while the actuating cams are mounted to the carriage assembly. Each switch is mounted to a plate that allows for a 0.625 inch (16 mm) adjustment range. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

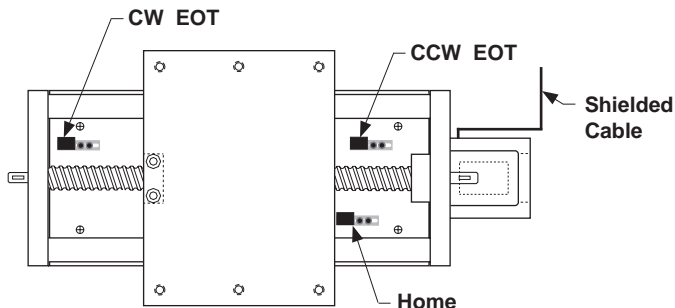
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located on the opposite side of the EOT switches, at the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 90-WC0 series, EOT switches are normally located 0.375 inches (9,5 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.750 inches (19,1 mm) from listed table travel for each model #. For the 90-WC1 series there is NO reduction of listed travel length when using EOT switches.

Note: Each switch bracket has a 0.625 inch (16 mm) adjustment range

Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

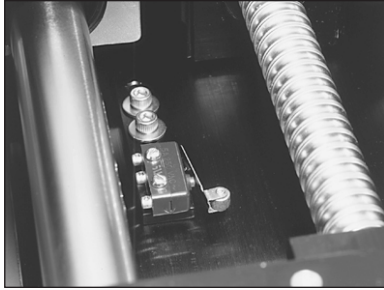
Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

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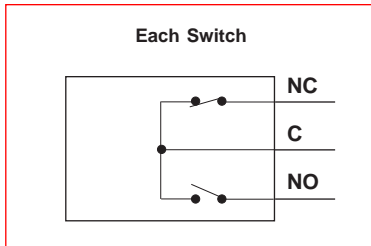
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End of Travel (EOT) Switches & Home Switch

Mechanical Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 amps @ 125 VAC
1 amp @ 85 VDC
- Activation Style : mechanical cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 85° C
- Environment : non wash down
- Added Table Width : none
- Individual Switch Wiring : none

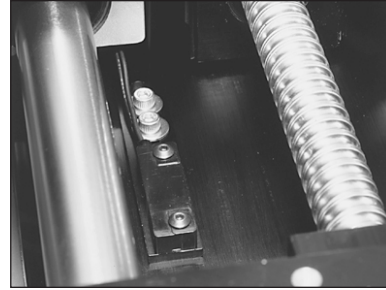


Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable, 6 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

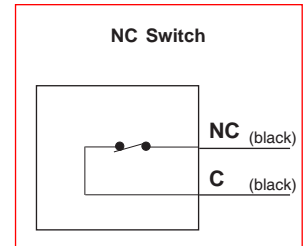
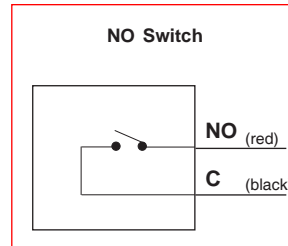
Wire Color	Description	
Black	CW EOT	NC
Blue	CW Common	C
Red	CCW EOT	NC
White	CCW Common	C
Brown	HOME	NO
Green	HOME Common	C
Silver	Shield	

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches



- Repeatability : +/- 0.0020 inch (50 microns)
- Electrical : 1.0 amps @ 125 VAC
0.5 amps @ 100 VDC
- Activation Style : magnetic
- Activation Area : 0.30 inches (7,62 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : non wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable, 6 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description	
Black	CW EOT (black)	NC
Blue	CW Common (black)	C
Red	CCW EOT (black)	NC
White	CCW Common (black)	C
Brown	HOME (red)	NO
Green	HOME Common (black)	C
Silver	Shield	

- CW - Clockwise
- CCW - Counter Clockwise
- EOT - End of Travel
- NC - Normally Closed
- NO - Normally Open

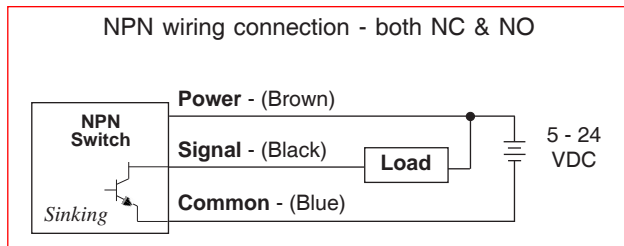
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End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



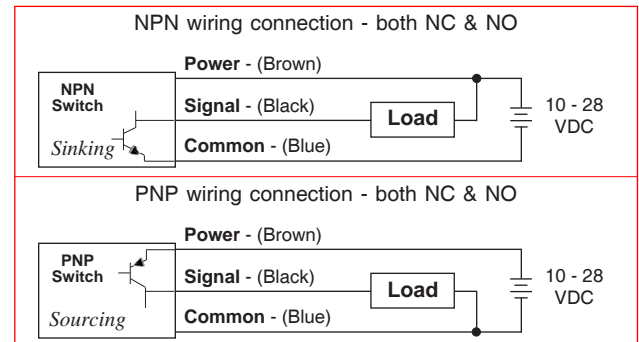
Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 10 - 28 VDC
15 mA - power input
100 mA max - signal
- Actuation Style : non-magnetic cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 75° C
- Environment : IEC IP67 wash down
- Added Table Width : none
- Individual Switch Wiring : 6.5 foot (2 m) cable for NPN
3.3 foot (1 m) cable for PNP



Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 90 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Specifications Subject to change without notice

Screws - Acme & Ball

90-WC0 series		90-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)						
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw						
				0.625 dia. 0.100 lead	0.625 dia. 0.200 lead	0.625 dia. 0.500 lead	0.625 dia. 1.000 lead	16 mm dia. 5 mm lead	16 mm dia. 10 mm lead	16 mm dia. 16 mm lead
90606	6 (150)	90604	4.7 (119)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
90612	12 (300)	90609	9.7 (246)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
90618	18 (455)	90614	14.8 (375)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
90624	24 (605)	90619	19.8 (502)	3.8 (96)	7.6 (193)	19.0 (483)	38.0 (874)	7.4 (188)	14.8 (376)	23.7 (602)
90630	30 (760)	90624	24.9 (632)	2.7 (69)	5.3 (135)	13.4 (340)	26.7 (625)	5.2 (132)	10.4 (264)	16.7 (424)
90636	36 (910)	90629	29.9 (759)	2.0 (51)	4.0 (102)	9.9 (251)	19.8 (467)	3.9 (99)	7.7 (196)	12.4 (315)
90648	48 (1215)	90640	40.2 (1021)	1.2 (30)	2.4 (61)	6.1 (155)	12.2 (292)	2.4 (61)	4.7 (119)	7.6 (193)
90660	60 (1520)	90650	50.2 (1275)	0.8 (20)	1.6 (41)	4.1 (104)	8.2 (198)	1.6 (41)	3.2 (81)	5.1 (130)
91206	6 (150)	91204	4.7 (119)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (188)	19.7 (500)	31.5 (800)
91212	12 (300)	91209	9.7 (246)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
91218	18 (455)	91214	14.8 (375)	3.8 (96)	7.6 (193)	19.0 (483)	38.0 (965)	7.4 (188)	14.8 (376)	23.7 (602)
90824	24 (605)	91219	19.8 (502)	2.7 (69)	5.3 (135)	13.4 (340)	26.7 (678)	5.2 (132)	10.4 (264)	16.7 (424)
91230	30 (760)	91224	24.9 (632)	2.0 (51)	4.0 (102)	9.9 (251)	19.8 (503)	3.9 (99)	7.7 (196)	12.4 (315)
91236	36 (910)	91229	29.9 (759)	1.5 (38)	3.1 (79)	7.6 (193)	15.3 (389)	3.0 (76)	6.0 (152)	9.5 (241)
91248	48 (1215)	91240	40.2 (1021)	1.0 (25)	2.0 (51)	4.9 (124)	9.9 (251)	1.9 (48)	3.9 (99)	6.2 (157)
91260	60 (1520)	91250	50.2 (1275)	0.7 (17)	1.4 (35)	3.4 (86)	6.9 (175)	1.3 (33)	2.7 (69)	4.3 (109)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

90-WC0 series		90-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)						
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw						
				0.750 dia. 0.200 lead	0.750 dia. 0.500 lead	20 mm dia. 5 mm lead	20 mm dia. 20 mm lead	1.000 dia. 0.250 lead	1.000 dia. 0.500 lead	1.000 dia. 1.000 lead
90606	6 (150)	90604	4.7 (119)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)	12.5 (317)	25.0 (635)	50.0 (1270)
90612	12 (300)	90609	9.7 (246)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)	12.5 (317)	25.0 (635)	50.0 (1270)
90618	18 (455)	90614	14.8 (375)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)	12.5 (317)	25.0 (635)	50.0 (1270)
90624	24 (600)	90619	19.8 (502)	9.1 (208)	22.7 (577)	9.0 (229)	35.9 (912)	12.5 (317)	25.0 (635)	50.0 (1270)
90630	30 (760)	90624	24.9 (632)	6.4 (163)	16.0 (406)	6.3 (147)	25.3 (643)	10.5 (267)	20.9 (531)	41.8 (1062)
90636	36 (910)	90629	29.9 (759)	4.7 (119)	11.9 (302)	4.7 (119)	18.8 (478)	7.8 (198)	15.5 (394)	31.0 (787)
90648	48 (1215)	90640	40.2 (1021)	2.9 (74)	7.3 (185)	2.9 (74)	11.5 (292)	4.7 (119)	9.5 (241)	19.0 (483)
90660	60 (1520)	90650	50.2 (1275)	2.0 (51)	4.9 (124)	1.9 (48)	7.8 (198)	3.2 (81)	6.4 (163)	12.8 (325)
91206	6 (150)	91204	4.7 (119)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)	12.5 (317)	25.0 (635)	50.0 (1270)
91212	12 (300)	91209	9.7 (246)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)	12.5 (317)	25.0 (635)	50.0 (1270)
91218	18 (455)	91214	14.8 (375)	9.1 (231)	22.7 (577)	9.0 (229)	35.9 (912)	12.5 (317)	25.0 (635)	50.0 (1270)
90824	24 (600)	91219	19.8 (502)	6.4 (163)	16.0 (406)	6.3 (160)	25.3 (643)	10.5 (267)	20.9 (531)	41.8 (1062)
91230	30 (760)	91224	24.9 (632)	4.7 (119)	11.9 (302)	4.7 (119)	18.8 (478)	7.8 (198)	15.5 (394)	31.0 (787)
91236	36 (910)	91229	29.9 (759)	3.7 (94)	9.1 (231)	3.6 (91)	14.5 (368)	6.0 (152)	12.0 (305)	23.9 (607)
91248	48 (1215)	91240	40.2 (1021)	2.4 (61)	5.9 (150)	2.3 (58)	9.3 (236)	3.9 (99)	7.7 (196)	15.5 (394)
91260	60 (1520)	91250	50.2 (1275)	1.6 (41)	4.1 (104)	1.6 (41)	6.5 (165)	2.7 (69)	5.4 (137)	10.8 (274)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S005)	800 (363)	6,150 (2790)	90	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S006)	720 (326)	6,070 (2753)		20 (0,14)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S007)	100 (45)	800 (363)	60	15 (0,11)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S008)	90 (41)	800 (363)		30 (0,21)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.625 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S009)	590 (267)	2,425 (1100)	90	25 (0,18)	< 0.004 (100)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S010)	530 (240)	2,390 (1084)		40 (0,28)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S011)	100 (45)	800 (363)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S012)	90 (41)	800 (363)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S013)	1,900 (862)	18,800 (8527)	90	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S014)	1,710 (776)	18,610 (8441)		30 (0,21)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S015)	195 (88)	1,500 (680)	60	25 (0,18)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S016)	175 (79)	1,500 (680)		40 (0,28)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.750 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S017)	3,450 (1565)	24,200 (10977)	90	25 (0,18)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S018)	3,150 (1429)	23,855 (10820)		40 (0,28)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S019)	195 (88)	1,500 (680)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S020)	175 (79)	1,500 (680)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.8 inch (20,3 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 90-WC0 (6 inch carriage) model versions. All the 12 inch carriage model numbers and the 90-WC1 series are not affected.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
1.000 inch dia. 0.250 inch lead	<i>Non-preloaded</i> (S021)	3,350 (1519)	30,750 (13947)	90	25 (0,18)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S022)	3,015 (1367)	30,415 (13796)		40 (0,28)			0
	<i>Non-preloaded</i> Turcite Nut (S023)	195 (88)	1,500 (680)	60	35 (0,25)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S024)	175 (79)	1,500 (680)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	
1.000 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S025)	3,950 (1791)	32,300 (14650)	90	30 (0,21)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S026)	3,555 (1612)	31,905 (14471)		50 (0,35)			0
	<i>Non-preloaded</i> Turcite Nut (S027)	195 (88)	1,500 (680)	60	45 (0,32)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S028)	175 (79)	1,500 (680)		80 (0,56)	0	+ 0.0002 to - 0.0002 (5) (5)	
1.000 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S029)	2,250 (1020)	13,750 (6236)	90	35 (0,25)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S030)	2,025 (918)	13,525 (6134)		60 (0,42)			0
	<i>Non-preloaded</i> Turcite Nut (S031)	195 (88)	1,500 (680)	60	50 (0,35)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S032)	175 (79)	1,500 (680)		90 (0,64)	0	+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 1.3 inch (33,0 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 90-WC0 (6 inch carriage) model versions. All the 12 inch carriage model numbers and the 90-WC1 series are not affected.

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Screws - Acme & Ball

SCREW	PRECISION BALL SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S114)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S115)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 5 mm lead	<i>Non-preloaded</i> (S116)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S117)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 10 mm lead	<i>Non-preloaded</i> (S118)	1,080 (489)	2,630 (1192)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S119)	972 (440)	2,365 (1072)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
16 mm dia. 16 mm lead	<i>Non-preloaded</i> (S120)	819 (371)	1,620 (734)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S121)	737 (334)	1,455 (659)		35 (0,24)		0		+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S122)	964 (437)	3,360 (1524)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S123)	867 (393)	3,025 (1372)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
20 mm dia. 5 mm lead	<i>Non-preloaded</i> (S124)	1,070 (485)	3,990 (1809)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S125)	960 (435)	3,590 (1628)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
20 mm dia. 20 mm lead	<i>Non-preloaded</i> (S128)	1,293 (586)	3,505 (1589)	90	25 (0,18)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	⁽⁴⁾ <i>Preloaded</i> (S129)	1,160 (526)	3,150 (1428)		40 (0,28)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

Screws - Acme & Ball

SCREW	GROUND BALL SCREWS ⁽²⁾							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 dia., 0.200 lead ⁽²⁾ Preloaded (S212)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5) (5)
0.625 dia., 0.500 lead ⁽²⁾ Preloaded (S213)	1430 (649)	4,191 (1901)	90	30 (0,21)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5) (5)
16 mm dia., 5 mm lead ⁽²⁾ Preloaded (S214)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5) (5)
16 mm dia., 16 mm lead ⁽²⁾ Preloaded (S215)	910 (412)	1,800 (816)	90	35 (0,24)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) The 0.625 inch & 16 mm diameter Ground Ball Screw options are only available in travel lengths where the screw length is less than 47 inches (1194 mm).

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Screws - Acme & Ball

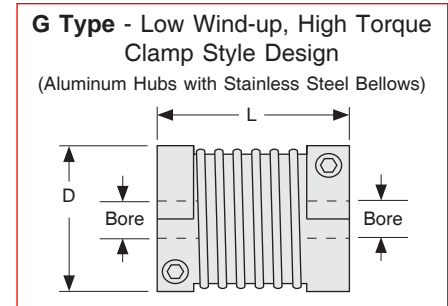
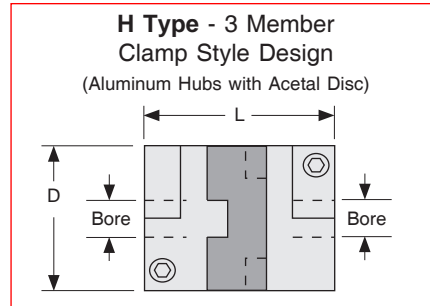
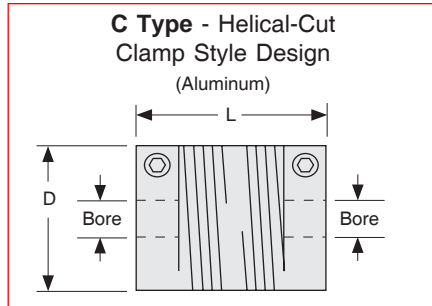
SCREW	ROLLED ACME SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.625 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S300)	160 (73)	800 (363)	40	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S301)	140 (64)	720 (327)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S302)	160 (73)	800 (363)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S303)	140 (64)	720 (327)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model Number (1)	D inches (mm)	L inches (mm)	Table	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
				Motor	Minimum (in) (mm)	Maximum (in) (mm)					
C100-375-aaa	1.00 (25,4)	1.50 (38,1)	375	aaa	.250 6	.375 10	1.5 (43)	.19 (35)	23.0 (0,9)	400 (2,8)	
C125-375-aaa	1.25 (31,8)	2.00 (50,8)	375	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)	
H100-375-aaa	1.00 (25,4)	1.28 (32,5)	375	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)	
H131-375-aaa	1.31 (33,3)	1.89 (48,0)	375	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)	
G100-375-aaa	0.99 (25,2)	1.26 (32,0)	375	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)	
G126-375-aaa	1.26 (32,1)	1.62 (41,0)	375	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)	
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch				005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm	012 = 12 mm 014 = 14 mm 016 = 16 mm					

Footnotes:

- (1) See page D-27 for maximum coupling diameter and length specifications for use with the optional NEMA 23 & 34 motor mounts. Custom motor mounts can be provided upon request.

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Specifications Subject to Change Without Notice

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

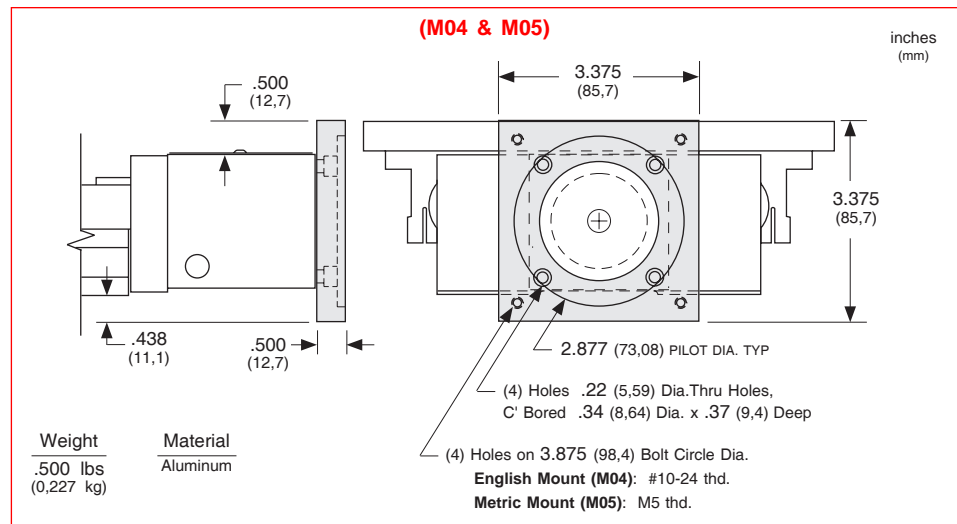
Specification	90 Series NEMA 23 bracket	90 Series NEMA 34 bracket
	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.375 (9,53)	0.375 (9,53)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)
Maximum coupling length	2.100 (53,34)	2.600 (66,04)
Note: Custom brackets available upon request.		

Coupling Part Numbers

C025 C100-375-250	C130 H100-375-250	C407 G100-375-250
C026 C100-375-375	C131 H100-375-375	C408 G100-375-375
C027 C100-375-006	C132 H100-375-006	C409 G100-375-500
C028 C100-375-008	C133 H100-375-008	C410 G100-375-006
C029 C100-375-010	C134 H100-375-010	C411 G100-375-008
		C412 G100-375-010
		C413 G100-375-012
C048 C125-375-250	C155 H131-375-250	C435 G126-375-250
C049 C125-375-375	C156 H131-375-375	C436 G126-375-375
C050 C125-375-500	C157 H131-375-500	C437 G126-375-500
C051 C125-375-006	C158 H131-375-625	C438 G126-375-625
C052 C125-375-008	C159 H131-375-006	C439 G126-375-006
C053 C125-375-010	C160 H131-375-008	C440 G126-375-008
C054 C125-375-012	C161 H131-375-010	C441 G126-375-010
C055 C125-375-014	C162 H131-375-012	C442 G126-375-012
	C163 H131-375-014	C443 G126-375-014
	C164 H131-375-016	C444 G126-375-016

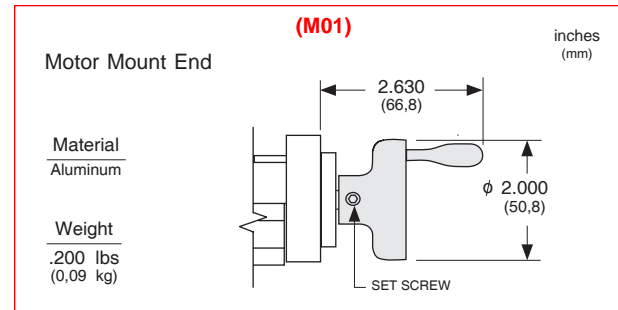
NEMA 34 Motor Mount

The NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



Hand Crank

For manually operated applications, *LINTECH* provides a hand crank option for the 90 table series. The hand crank replaces the motor mount and coupling on the table.

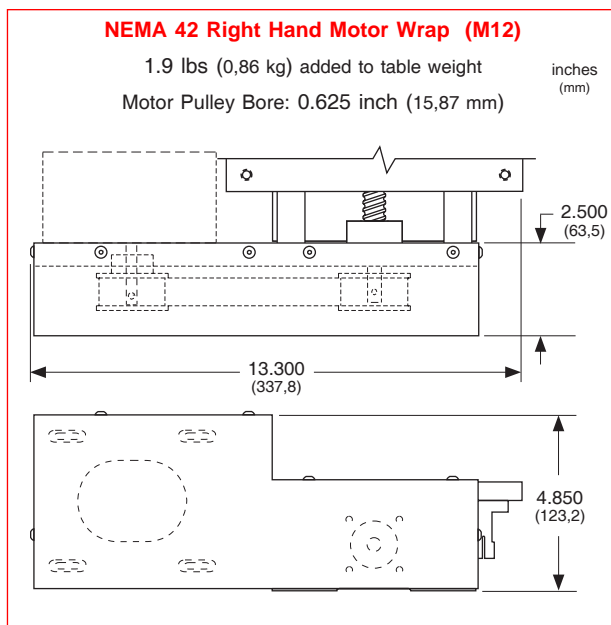
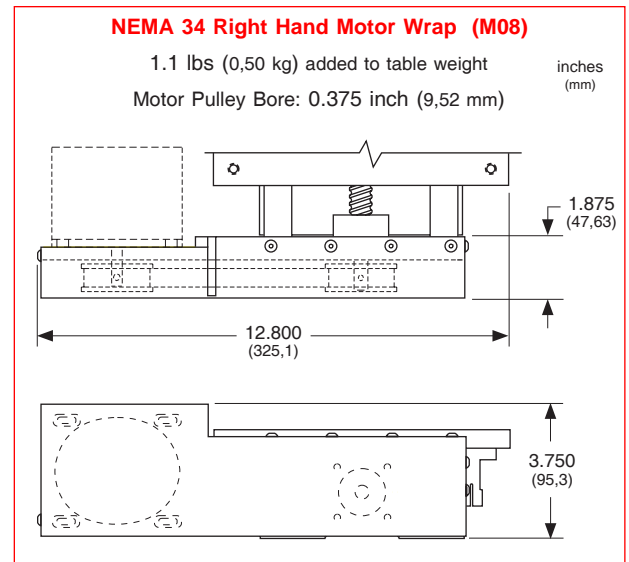
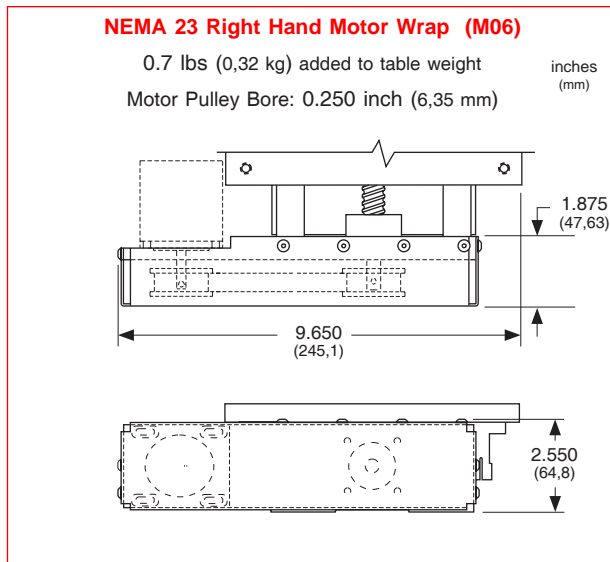


Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages

For space limited 90 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores MUST be specified for non-NEMA motors.

Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 23	1.65 (41,9)	7.5 (0,21)	1.65 (41,9)	7.5 (0,21)	1.0 (0,028)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)
NEMA 42	2.12 (53,9)	19.2 (0,54)	2.12 (53,9)	19.2 (0,54)	3.0 (0,085)

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Power-off Electric Brakes

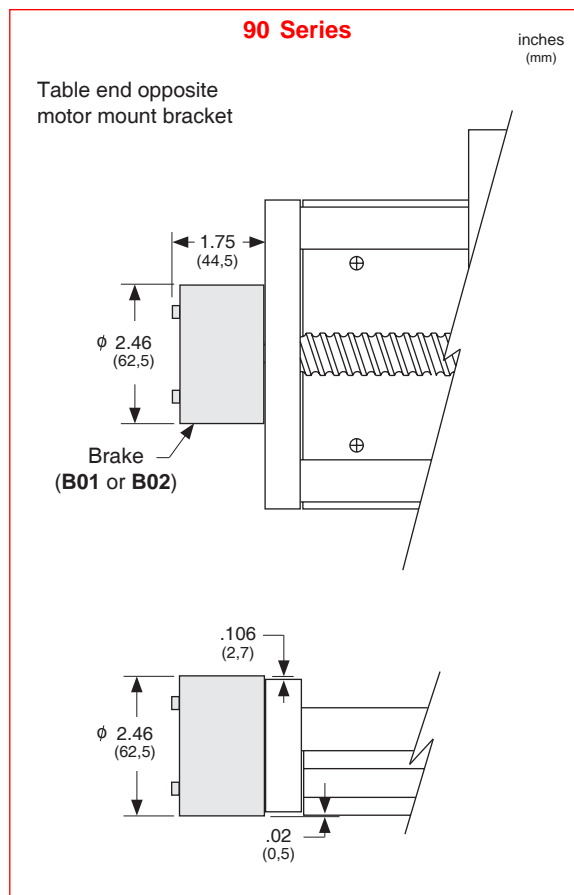
For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 90 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)

Note: This power-off electric brake **MUST NOT** be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.



Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60

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Linear & Rotary Incremental Encoders

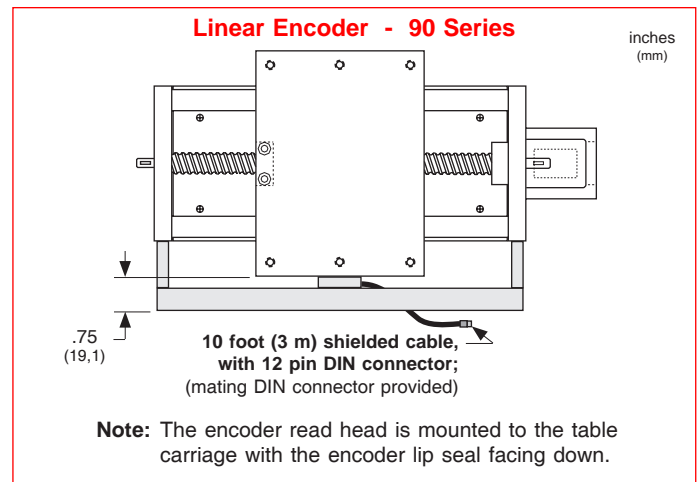
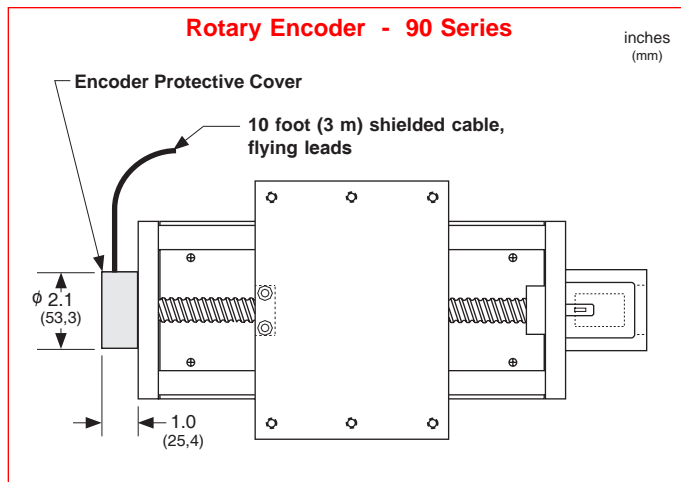
Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 90 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 90 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.

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LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

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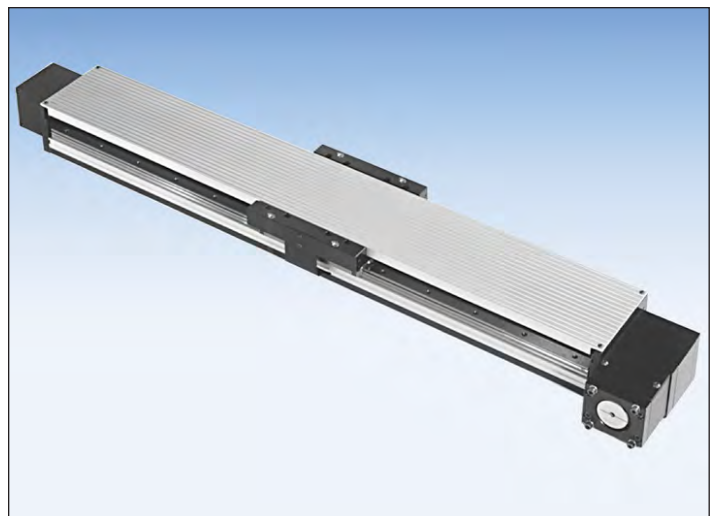
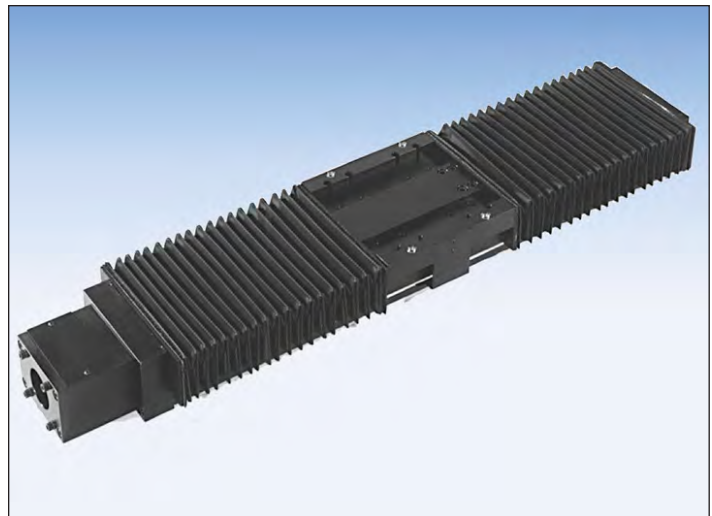
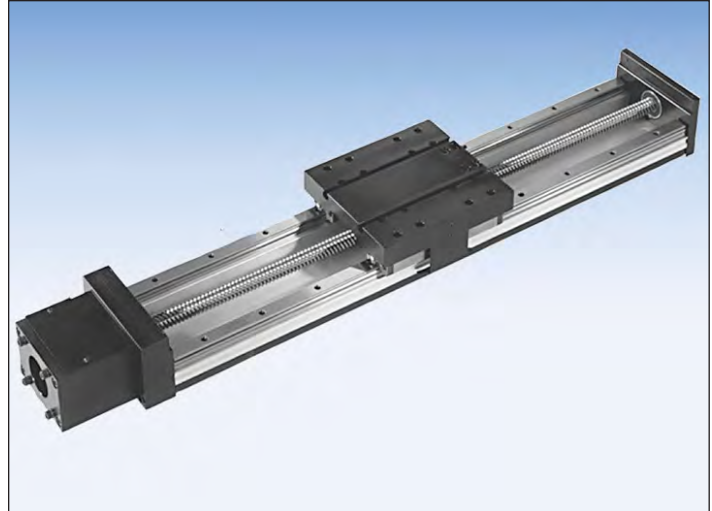
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Specifications Subject to Change Without Notice

160, 170, & 180 Series Positioning Tables

160 Series Specifications _____	E-4
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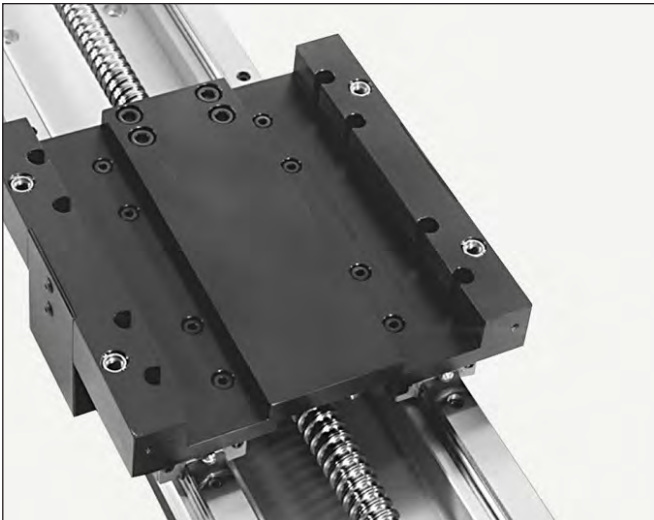
Single or Multiple Axis

LINTECH's 160 and 170 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ Welding
- ❑ Test Stands
- ❑ Part Insertion
- ❑ Laser Positioning
- ❑ Liquid Dispensing
- ❑ Semiconductor Processing
- ❑ Gluing
- ❑ Pick & Place
- ❑ Part Scanning
- ❑ Inspection Stations
- ❑ General Automation

Quality Construction

LINTECH's 160 & 170 series tables are designed to maximize performance while minimizing physical size and cost. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on precision ground linear rails. The linear rails are mounted to an aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage. The 160 series uses a T-slot for mounting of the user load, while the 170 series uses threaded stainless steel inserts for high strength and wear life. There are 38 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and can be configured for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 160 & 170 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various LINTECH positioning tables, thus providing for easy multiple axis configurations.

Cover Plates and Waycovers

For harsh environmental conditions, or for operator protection, these tables can be fitted with either aluminum cover plates, or waycovers. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 160 & 170 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 160 & 170 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

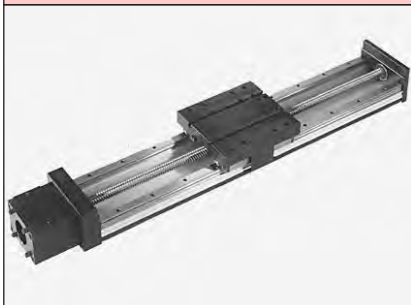
Other

The 160 & 170 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

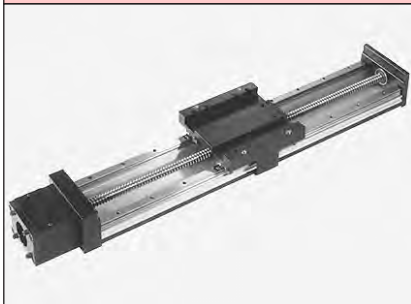
Standard Features - 160 & 170 Series

- Compact 5.50 inches (139,7 mm) wide by 2.953 inches (75 mm) tall - 160 series
- Compact 6.00 inches (152,4 mm) wide by 2.953 inches (75 mm) tall - 170 series
- T-slot or threaded stainless steel inserts in carriage for load mounting
- Travel lengths from 6 inches (150 mm) to 60 inches (1520 mm)
- 0° F to +185° F (-18° C to +85° C) operating temperature
- Recirculating linear ball bearing system
- Precision ground square rail design
- 2 rails; 2, 4, or 6 bearing carriages

160-CP0 Series



170-CP0 Series



170-CP1 Series



170-CP2 Series



Options - 160 & 170 Series

- Chrome plated linear bearings, rails and screws
- End of travel (EOT) and home switches wired
- CAD drawings available via our Website
- Adapter brackets for non-NEMA motors
- Linear and rotary incremental encoders
- NEMA 23 & 34 motor wrap packages
- NEMA 34 adapter bracket
- NEMA 34 adapter bracket
- Power-off electric brakes
- Turcite nut option
- Ball screws:
- Motor couplings
- Cover plates
- Waycovers

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 0.625 inch diameter, 1.000 inch lead
- 0.750 inch diameter, 0.200 inch lead
- 0.750 inch diameter, 0.500 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 10 mm lead
- 16 mm diameter, 16 mm lead
- 0.750 inch diameter, 0.200 inch lead
- 20 mm diameter, 5 mm lead
- 20 mm diameter, 20 mm lead

Ground - Preloaded Nuts Only:

- 0.625 inch diameter, 0.200 inch lead
- 0.625 inch diameter, 0.500 inch lead

- Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.100 inch lead
- 0.625 inch diameter, 0.200 inch lead

170-WC1 Series



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Specifications subject to change without notice

16 - **2** - **6** - **06** - **CP0** - **0** - **S005** - **M02** - **C155** - **L01** - **E00** - **B00**

Table Series

Number of Bearings

2 - 2 bearings **4** - 4 bearings

Carriage Length

6 - 6 inches

Travel Length (see page E-6)

06 - 6 to 60 inches

Cover Plate

CP0 - no cover plate

Carriage Inserts (see page E-7)

0 - T-slot mount

Screw Options (see pages E-30 to E-35)

Rolled ball screws

S005 - .625 x .200 NPL
S006 - .625 x .200 PL
S007 - .625 x .200 NPL(T)
S008 - .625 x .200 PL(T)
S009 - .625 x 1.000 NPL
S010 - .625 x 1.000 PL
S011 - .625 x 1.000 NPL(T)
S012 - .625 x 1.000 PL(T)
S013 - .750 x .200 NPL
S014 - .750 x .200 PL
S015 - .750 x .200 NPL(T)
S016 - .750 x .200 PL(T)

Rolled ball screws

S017 - .750 x .500 NPL
S018 - .750 x .500 PL
S019 - .750 x .500 NPL(T)
S020 - .750 x .500 PL(T)

Ground ball screws

S212 - .625 x .200 PL
S213 - .625 x .500 PL
S214 - 16 x 5 PL
S215 - 16 x 16 PL

Rolled acme screws

S300 - .625 x .100 NPL
S301 - .625 x .100 PL
S302 - .625 x .200 NPL
S303 - .625 x .200 PL

Precision ball screws

S114 - .625 x .200 NPL
S115 - .625 x .200 PL
S116 - 16 x 5 NPL
S117 - 16 x 5 PL
S118 - 16 x 10 NPL
S119 - 16 x 10 PL
S120 - 16 x 16 NPL
S121 - 16 x 16 PL
S122 - .750 x .200 NPL
S123 - .750 x .200 PL
S124 - 20 x 5 NPL
S125 - 20 x 5 PL
S128 - 20 x 20 NPL
S129 - 20 x 20 PL

S999 - other

Motor Mount (see pages E-7, E-68 to E-69)

M00 - none **M02** - NEMA 23 mount (E) **M06** - NEMA 23 (RH) wrap
M01 - hand crank **M03** - NEMA 23 mount (M) **M07** - NEMA 23 (LH) wrap
M20 to M98 - see Website **M04** - NEMA 34 mount (E) **M08** - NEMA 34 (RH) wrap
M99 - other **M05** - NEMA 34 mount (M) **M09** - NEMA 34 (LH) wrap

Coupling Options (see pages E-66 to E-67)

C000 - none **C025 to C030** - C100 **C130 to C136** - H100 **C407 to C415** - G100
C999 - other **C048 to C069** - C125 **C155 to C184** - H131 **C435 to C464** - G126
 C197 to C199 - H163 **C470 to C480** - G158

Limit & Home Switches (see pages E-63 to E-65)

L00 - no switches Mechanical Reed Hall Prox (NPN) Prox (PNP)
L99 - other EOT & home switches **L01** **L04** **L07** **L10** **L13**
 EOT switches only **L02** **L05** **L08** **L11** **L14**
 home switch only **L03** **L06** **L09** **L12** **L15**

Encoder Options (see page E-71)

E00 - none **E02** - rotary (1000 lines/rev) **E10** - linear (2500 lines/inch) **E99** - other
E01 - rotary (500 lines/rev) **E03** - rotary (1270 lines/rev) **E11** - linear (125 lines/mm)

Power-off Brakes (see page E-70)

B00 - none **B01** - 24 VDC **B02** - 90 VDC **B99** - other

(E) - English Interface (NPL) - Non Preloaded
(LH) - Left Hand (PL) - Preloaded
(M) - Metric Interface (RH) - Right Hand
(T) - Turcite Nut

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	3,890 lbs	(1765 kgf)	7,780 lbs	(3530 kgf)
Dynamic Horizontal	50 million inches (1270 km) of travel	1,045 lbs	(474 kgf)	2,090 lbs	(948 kgf)
Static Horizontal		5,830 lbs	(2645 kgf)	11,660 lbs	(5290 kgf)
Dynamic Roll Moment	2 million inches (50 km) of travel	510 ft-lbs	(690 N-m)	1,025 ft-lbs	(1390 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	137 ft-lbs	(185 N-m)	275 ft-lbs	(370 N-m)
Static Roll Moment		915 ft-lbs	(1240 N-m)	1,830 ft-lbs	(2480 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	71 ft-lbs	(96 N-m)	930 ft-lbs	(1260 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	19 ft-lbs	(26 N-m)	250 ft-lbs	(339 N-m)
Static Pitch & Yaw Moment		126 ft-lbs	(170 N-m)	1,670 ft-lbs	(2260 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	1,945 lbs	(882 kgf)	1,945 lbs	(882 kgf)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	525 lbs	(238 kgf)	525 lbs	(238 kgf)
Each Bearing Static Load Capacity		2,910 lbs	(1320 kgf)	2,910 lbs	(1320 kgf)
Thrust Force Capacity	10 million screw revolutions	895 lbs	(406 kgf)	895 lbs	(406 kgf)
Thrust Force Capacity	500 million screw revolutions	240 lbs	(109 kgf)	240 lbs	(109 kgf)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	3.660 in	(92,96 mm)	3.660 in	(92,96 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	3.290 in	(83,57 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.320 in	(33,53 mm)	1.320 in	(33,53 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages E-30 to E-35)	Acme Screw - Stainless Steel
Screw Material (see pages E-30 to E-35)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00016 in/in (< 4,06 microns/25mm)
Flatness	< 0.00016 in/in (< 4,06 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available

Dimensions & Specifications

- With T-Slot Load Mounting -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight
		A	B	C	M		lbs (kg)
16x606-CP0	6 (150)	12.125 (308,0)	16.688 (423,9)	3	8	16.00 (406)	14.2 (6,4)
16x612-CP0	12 (300)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	16.4 (7,4)
16x618-CP0	18 (455)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	18.6 (8,4)
16x624-CP0	24 (605)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	20.8 (9,4)
16x630-CP0	30 (760)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	23.0 (10,4)
16x636-CP0	36 (910)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	25.2 (11,4)
16x642-CP0	42 (1060)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	27.4 (12,4)
16x648-CP0	48 (1215)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	29.6 (13,4)
16x654-CP0	54 (1370)	60.125 (1527,1)	64.688 (1643,0)	19	40	64.00 (1625)	31.8 (14,4)
16x660-CP0	60 (1520)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	34.0 (15,4)

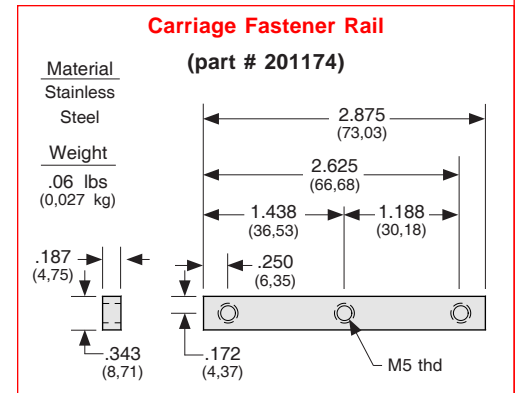
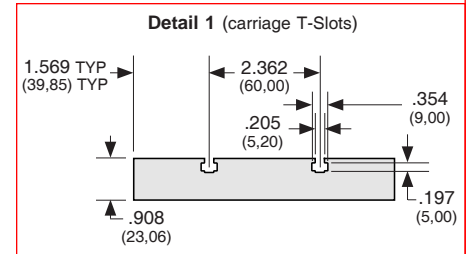
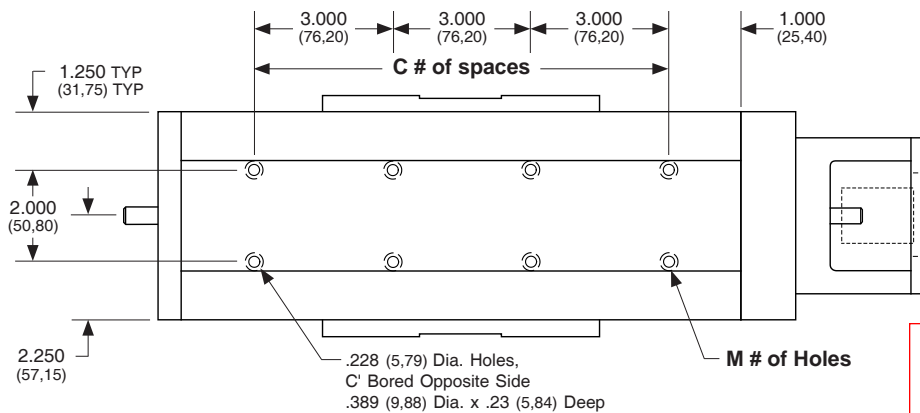
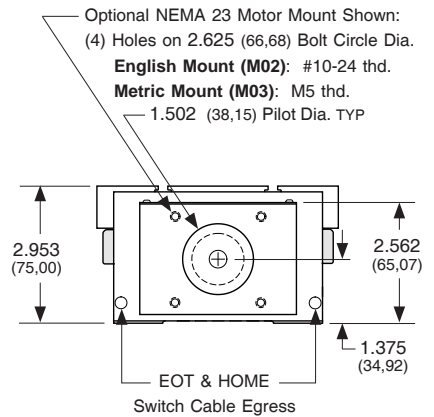
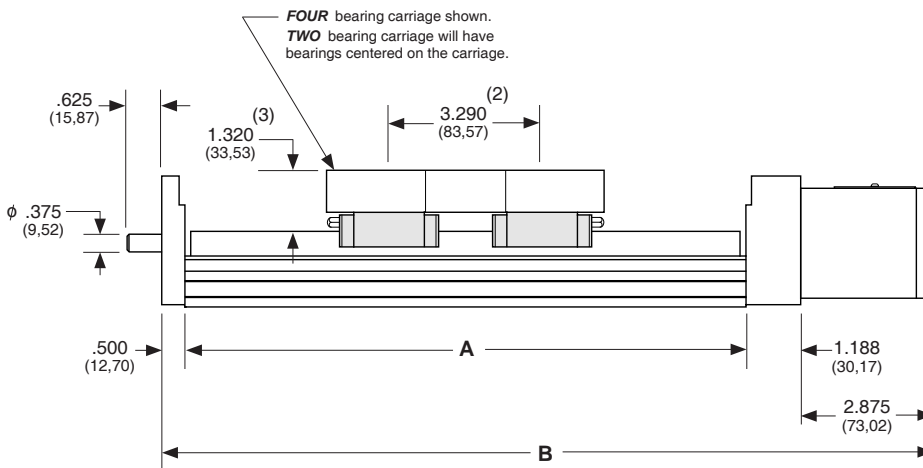
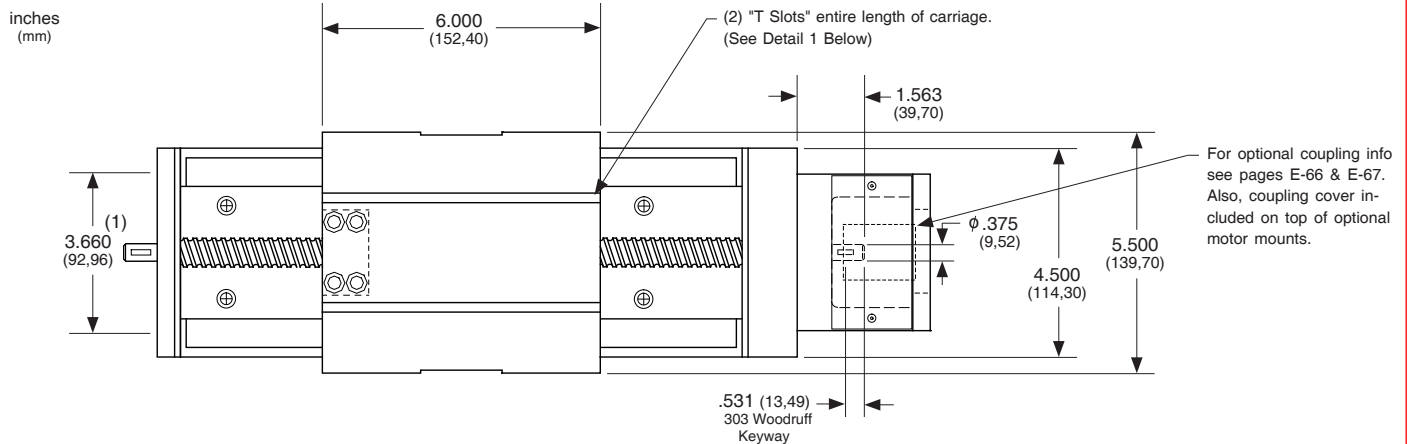
- x = 2; Carriage has 2 bearings; Carriage weight = 3.3 lbs. (1,50 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 4.1 lbs. (1,86 kg)

Footnotes:

- (1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With T-Slot Load Mounting -



- (1) This value is center to center distance (spread) between the two rails (d_s).
- (2) This value is center to center distance (spacing) of the bearings on a single rail (d_r).
- (3) This value is center distance of the bearing to top of carriage plate surface (d_t).

Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

17 **2** **6** **06** - **CP1** - **1** - **S005** - **M02** - **C155** - **L01** - **E00** - **B00**

Table Series

Number of Bearings

2 - 2 bearings **4** - 4 bearings

Carriage Length

6 - 6 inches

Travel Length (see pages E-10, E-12, E-14 & E-16)

06 - 3 to 60 inches

Cover Plate

CP0 - no cover plates **CP1** - top cover plate only **CP2** - top & side cover plates **WC1** - waycovers

Carriage Inserts (see pages E-11, E-13, E-15 & E-17)

1 - English mount **2** - Metric mount

Screw Options (see pages E-30 to E-35)

Rolled ball screws

S005 - .625 x .200 NPL
S006 - .625 x .200 PL
S007 - .625 x .200 NPL(T)
S008 - .625 x .200 PL(T)
S009 - .625 x 1.000 NPL
S010 - .625 x 1.000 PL
S011 - .625 x 1.000 NPL(T)
S012 - .625 x 1.000 PL(T)
S013 - .750 x .200 NPL
S014 - .750 x .200 PL
S015 - .750 x .200 NPL(T)
S016 - .750 x .200 PL(T)

Rolled ball screws

S017 - .750 x .500 NPL
S018 - .750 x .500 PL
S019 - .750 x .500 NPL(T)
S020 - .750 x .500 PL(T)

Ground ball screws

S212 - .625 x .200 PL
S213 - .625 x .500 PL
S214 - 16 x 5 PL
S215 - 16 x 16 PL

Precision ball screws

S114 - .625 x .200 NPL
S115 - .625 x .200 PL
S116 - 16 x 5 NPL
S117 - 16 x 5 PL
S118 - 16 x 10 NPL
S119 - 16 x 10 PL
S120 - 16 x 16 NPL
S121 - 16 x 16 PL
S122 - .750 x .200 NPL
S123 - .750 x .200 PL
S124 - 20 x 5 NPL
S125 - 20 x 5 PL
S128 - 20 x 20 NPL
S129 - 20 x 20 PL

Rolled acme screws

S300 - .625 x .100 NPL
S301 - .625 x .100 PL
S302 - .625 x .200 NPL
S303 - .625 x .200 PL

S999 - other

Motor Mount (see pages E-11, E-13, E-15, E-17, E-68 & E-69)

M00 - none **M02** - NEMA 23 mount (E) **M06** - NEMA 23 (RH) wrap
M01 - hand crank **M03** - NEMA 23 mount (M) **M07** - NEMA 23 (LH) wrap
M20 to M98 - see Website **M04** - NEMA 34 mount (E) **M08** - NEMA 34 (RH) wrap
M99 - other **M05** - NEMA 34 mount (M) **M09** - NEMA 34 (LH) wrap

Coupling Options (see pages E-66 to E-67)

C000 - none **C025 to C030** - C100 **C130 to C136** - H100 **C407 to C415** - G100
C999 - other **C048 to C069** - C125 **C155 to C184** - H131 **C435 to C464** - G126
C197 to C199 - H163 **C470 to C480** - G158

Limit & Home Switches (see pages E-63 to E-65)

L00 - no switches		Mechanical	Reed	Hall	Prox (NPN)	Prox (PNP)
L99 - other	EOT & home switches	L01	L04	L07	L10	L13
	EOT switches only	L02	L05	L08	L11	L14
	home switch only	L03	L06	L09	L12	L15

Encoder Options (see page E-71)

E00 - none **E02** - rotary (1000 lines/rev) **E10** - linear (2500 lines/inch) **E99** - other
E01 - rotary (500 lines/rev) **E03** - rotary (1270 lines/rev) **E11** - linear (125 lines/mm)

Power-off Brakes (see page E-70)

B00 - none **B01** - 24 VDC **B02** - 90 VDC **B99** - other

(E) - English Interface	(NPL) - Non Preloaded
(LH) - Left Hand	(PL) - Preloaded
(M) - Metric Interface	(RH) - Right Hand
	(T) - Turcite Nut

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	3,890 lbs	(1765 kgf)	7,780 lbs	(3530 kgf)
Dynamic Horizontal	50 million inches (1270 km) of travel	1,045 lbs	(474 kgf)	2,090 lbs	(948 kgf)
Static Horizontal		5,830 lbs	(2645 kgf)	11,660 lbs	(5290 kgf)
Dynamic Roll Moment	2 million inches (50 km) of travel	510 ft-lbs	(690 N-m)	1,025 ft-lbs	(1390 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	137 ft-lbs	(185 N-m)	275 ft-lbs	(370 N-m)
Static Roll Moment		915 ft-lbs	(1240 N-m)	1,830 ft-lbs	(2480 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	71 ft-lbs	(96 N-m)	930 ft-lbs	(1260 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	19 ft-lbs	(26 N-m)	250 ft-lbs	(339 N-m)
Static Pitch & Yaw Moment		126 ft-lbs	(170 N-m)	1,670 ft-lbs	(2260 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	1,945 lbs	(882 kgf)	1,945 lbs	(882 kgf)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	525 lbs	(238 kgf)	525 lbs	(238 kgf)
Each Bearing Static Load Capacity		2,910 lbs	(1320 kgf)	2,910 lbs	(1320 kgf)
Thrust Force Capacity	10 million screw revolutions	895 lbs	(406 kgf)	895 lbs	(406 kgf)
Thrust Force Capacity	500 million screw revolutions	240 lbs	(109 kgf)	240 lbs	(109 kgf)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	3.660 in	(92,96 mm)	3.660 in	(92,96 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	-		3.290 in	(83,57 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.320 in	(33,53 mm)	1.320 in	(33,53 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages E-30 to E-35)	Acme Screw - Stainless Steel
Screw Material (see pages E-30 to E-35)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00016 in/in (< 4,06 microns/25mm)
Flatness	< 0.00016 in/in (< 4,06 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows mounted to carriage & end plates

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Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight
		A	B	C	M		lbs (kgf)
17x606-CP0	6 (150)	12.125 (308,0)	16.688 (423,9)	3	8	16.00 (406)	14.2 (6,4)
17x612-CP0	12 (300)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	16.0 (7,3)
17x618-CP0	18 (455)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	17.8 (8,1)
17x624-CP0	24 (605)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	19.6 (8,9)
17x630-CP0	30 (760)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	21.4 (9,7)
17x636-CP0	36 (910)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	23.2 (10,5)
17x642-CP0	42 (1060)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	25.0 (11,3)
17x648-CP0	48 (1215)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	26.8 (12,2)
17x654-CP0	54 (1370)	60.125 (1527,1)	64.688 (1643,0)	19	40	64.00 (1625)	28.6 (13,0)
17x660-CP0	60 (1520)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	30.4 (13,8)

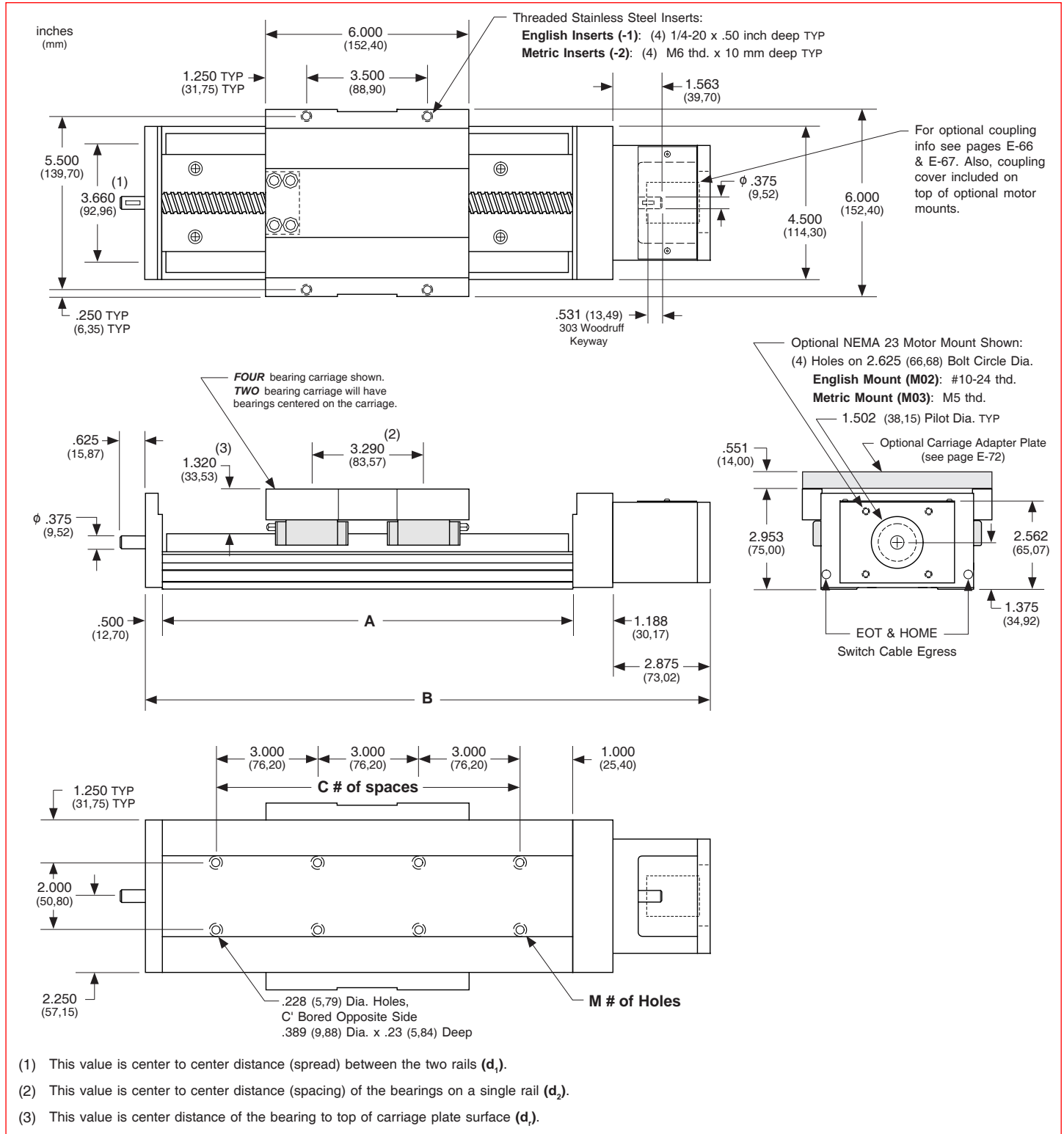
- x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- Without Cover Plates -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table Weight lbs (kg)
		A	B	C	M		
17x606-CP1	6 (150)	12.125 (308,0)	16.688 (423,9)	3	8	16.00 (406)	15.0 (6,8)
17x612-CP1	12 (300)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	17.2 (7,8)
17x618-CP1	18 (455)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	19.4 (8,8)
17x624-CP1	24 (605)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	21.6 (9,8)
17x630-CP1	30 (760)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	23.8 (10,8)
17x636-CP1	36 (910)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	26.0 (11,8)
17x642-CP1	42 (1060)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	28.2 (12,8)
17x648-CP1	48 (1215)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	30.4 (13,8)
17x654-CP1	54 (1370)	60.125 (1527,1)	64.688 (1643,0)	19	40	64.00 (1625)	32.6 (14,8)
17x660-CP1	60 (1520)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	34.8 (15,8)

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}

 x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)

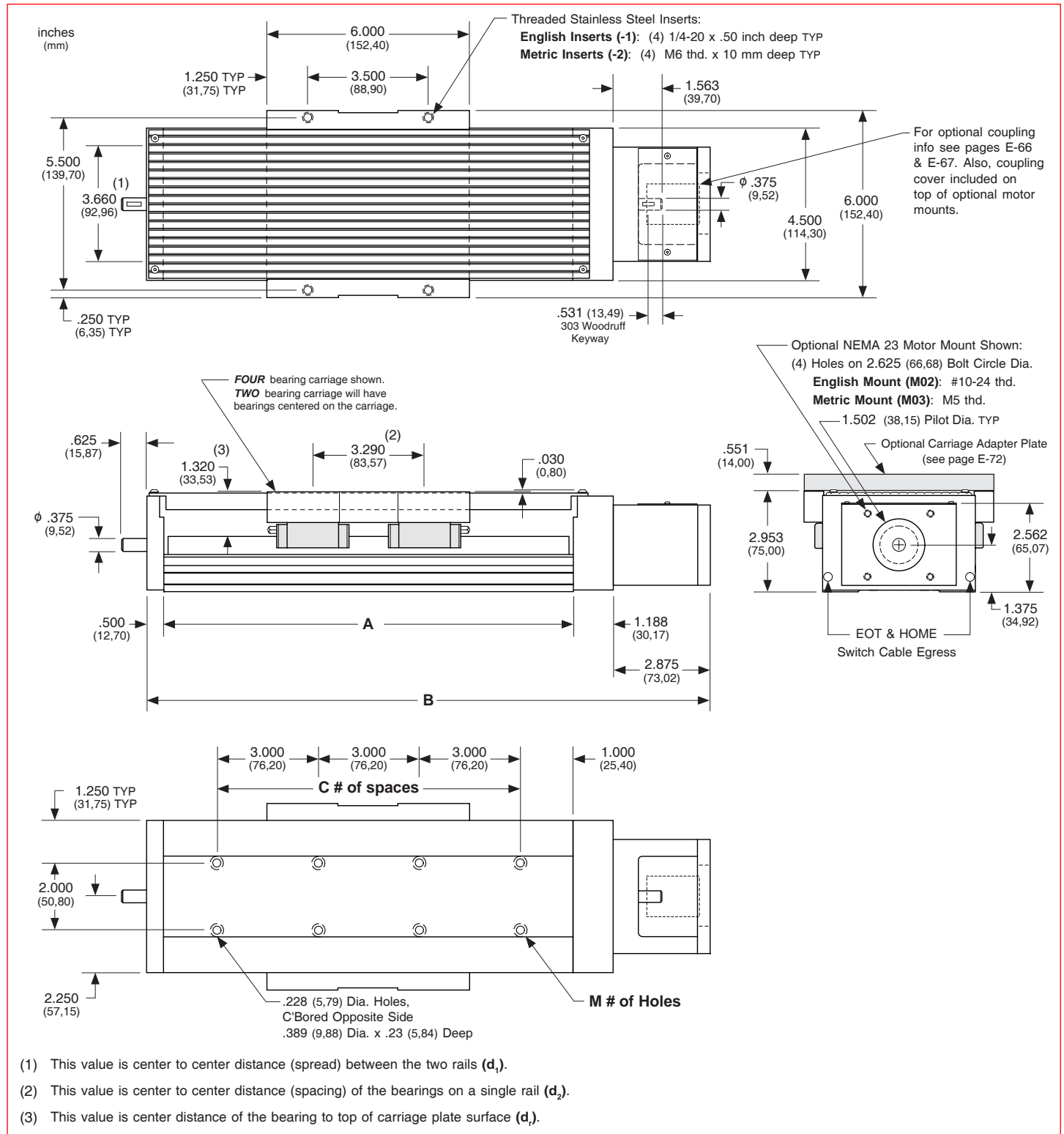
 x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Top Cover Plate Only -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	M		
17x606-CP2	6 (150)	12.125 (308,0)	16.688 (423,9)	3	8	16.00 (406)	16.6 (7,5)
17x612-CP2	12 (300)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	19.1 (8,7)
17x618-CP2	18 (455)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	21.7 (9,8)
17x624-CP2	24 (605)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	24.3 (11,0)
17x630-CP2	30 (760)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	26.8 (12,2)
17x636-CP2	36 (910)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	29.4 (13,3)
17x642-CP2	42 (1060)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	32.0 (14,5)
17x648-CP2	48 (1215)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	34.5 (15,6)
17x654-CP2	54 (1370)	60.125 (1527,1)	64.688 (1643,0)	19	40	64.00 (1625)	37.1 (16,8)
17x660-CP2	60 (1520)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	39.6 (17,9)

- x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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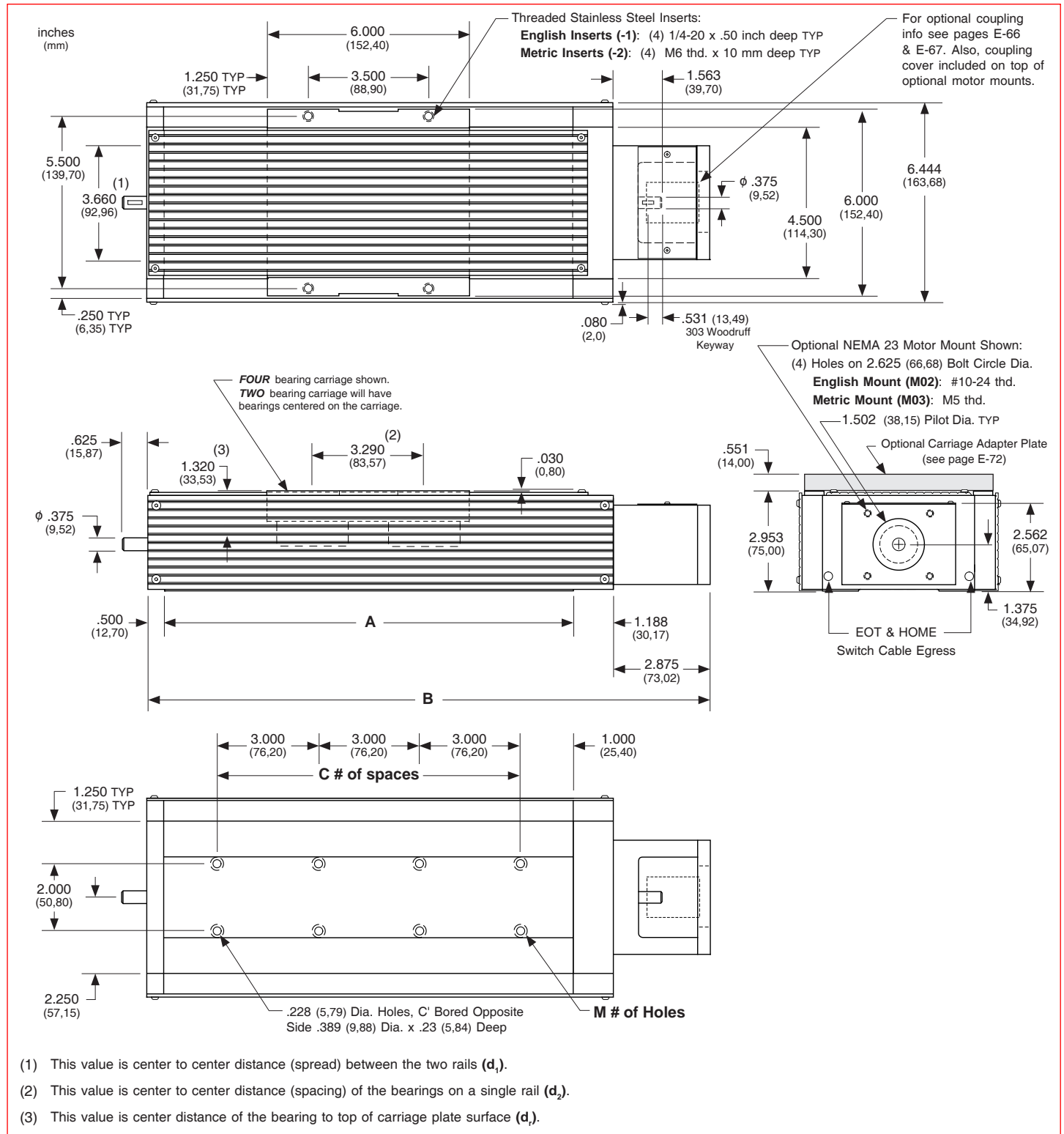
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Dimensions

- With Top & Side Cover Plates -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
17x603-WC1	3.7 (94)	12.125 (308,0)	16.688 (423,9)	3	8	16.00 (406)	14.8 (6,7)
17x608-WC1	8.0 (203)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	16.8 (7,6)
17x612-WC1	12.8 (325)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	18.8 (8,5)
17x617-WC1	17.5 (444)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	20.9 (9,5)
17x622-WC1	22.0 (555)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	22.7 (10,3)
17x628-WC1	28.0 (710)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	24.7 (11,2)
17x632-WC1	32.5 (825)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	26.7 (12,1)
17x637-WC1	37.0 (935)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	28.7 (13,0)
17x641-WC1	41.5 (1050)	60.125 (1527,1)	64.688 (1643,0)	19	40	64.00 (1625)	30.8 (14,0)
17x647-WC1	47.5 (1205)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	33.0 (15,0)

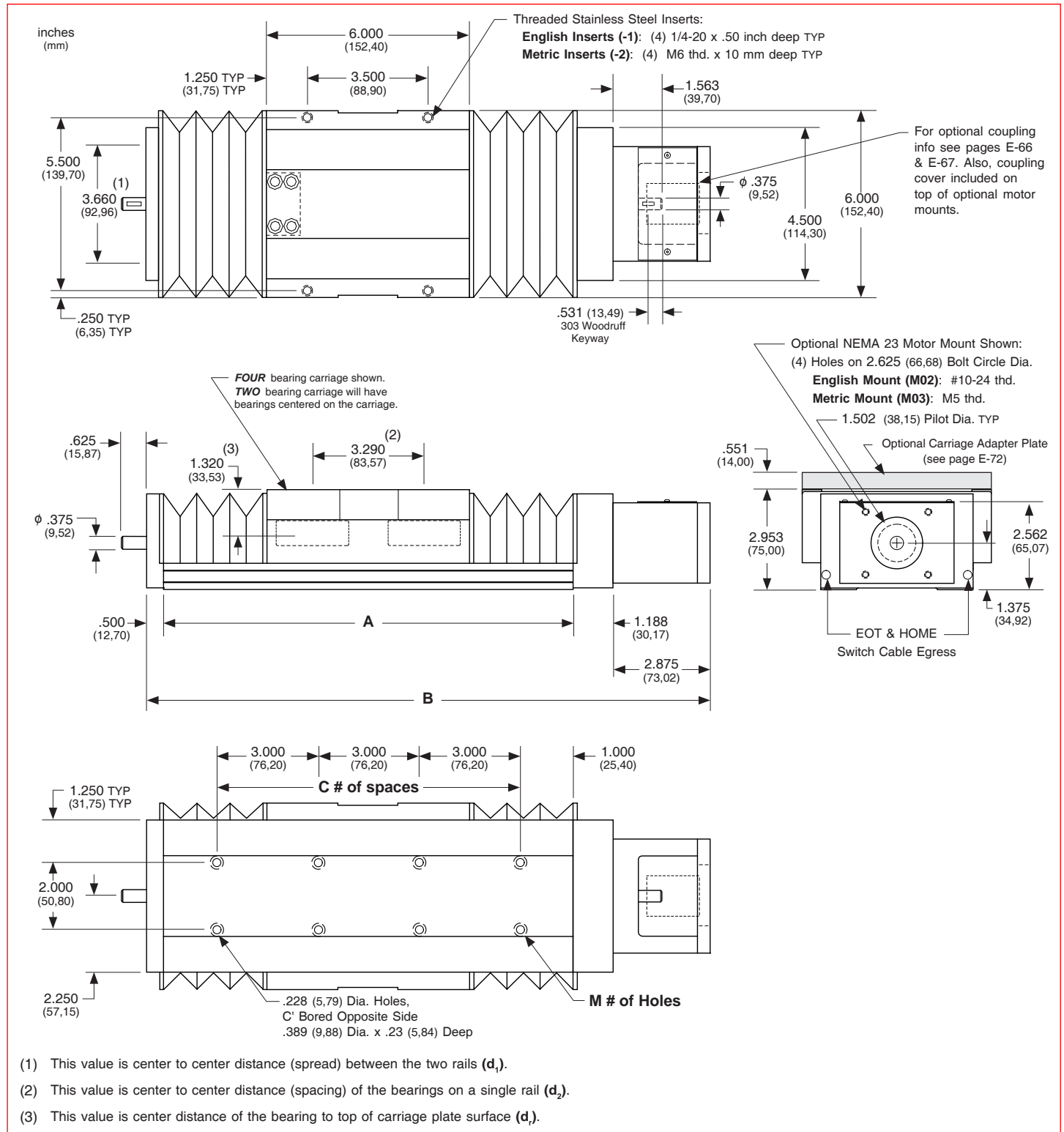
- x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Waycovers -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

17 6 12 06 - CP1 - 1 - S005 - M02 - C155 - L01 - E00 - B00

Table Series

Number of Bearings

4 - 4 bearings 6 - 6 bearings

Carriage Length

12 - 12 inches

Travel Length (see pages E-20, E-22, E-24 & E-26)

06 - 3 to 54 inches

Cover Plate

CP0 - no cover plates **CP1** - top cover plate only **CP2** - top & side cover plates **WC1** - waycovers

Carriage Inserts (see pages E-21, E-23, E-25 & E-27)

1 - English mount 2 - Metric mount

Screw Options (see pages E-30 to E-35)

Rolled ball screws

S005 - .625 x .200 NPL
S006 - .625 x .200 PL
S007 - .625 x .200 NPL(T)
S008 - .625 x .200 PL(T)
S009 - .625 x 1.000 NPL
S010 - .625 x 1.000 PL
S011 - .625 x 1.000 NPL(T)
S012 - .625 x 1.000 PL(T)
S013 - .750 x .200 NPL
S014 - .750 x .200 PL
S015 - .750 x .200 NPL(T)
S016 - .750 x .200 PL(T)

Rolled ball screws

S017 - .750 x .500 NPL
S018 - .750 x .500 PL
S019 - .750 x .500 NPL(T)
S020 - .750 x .500 PL(T)

Ground ball screws

S212 - .625 x .200 PL
S213 - .625 x .500 PL
S214 - 16 x 5 PL
S215 - 16 x 16 PL

Precision ball screws

S114 - .625 x .200 NPL
S115 - .625 x .200 PL
S116 - 16 x 5 NPL
S117 - 16 x 5 PL
S118 - 16 x 10 NPL
S119 - 16 x 10 PL
S120 - 16 x 16 NPL
S121 - 16 x 16 PL
S122 - .750 x .200 NPL
S123 - .750 x .200 PL
S124 - 20 x 5 NPL
S125 - 20 x 5 PL
S128 - 20 x 20 NPL
S129 - 20 x 20 PL

Rolled acme screws

S300 - .625 x .100 NPL
S301 - .625 x .100 PL
S302 - .625 x .200 NPL
S303 - .625 x .200 PL

S999 - other

Motor Mount (see pages E-21, E-23, E-25, E-27, E-68 & E-69)

M00 - none **M02** - NEMA 23 mount (E) **M06** - NEMA 23 (RH) wrap
M01 - hand crank **M03** - NEMA 23 mount (M) **M07** - NEMA 23 (LH) wrap
M20 to M98 - see Website **M04** - NEMA 34 mount (E) **M08** - NEMA 34 (RH) wrap
M99 - other **M05** - NEMA 34 mount (M) **M09** - NEMA 34 (LH) wrap

Coupling Options (see pages E-66 to E-67)

C000 - none **C025 to C030** - C100 **C130 to C136** - H100 **C407 to C415** - G100
C999 - other **C048 to C069** - C125 **C155 to C184** - H131 **C435 to C464** - G126
C197 to C199 - H163 **C470 to C480** - G158

Limit & Home Switches (see pages E-63 to E-65)

L00 - no switches		Mechanical	Reed	Hall	Prox (NPN)	Prox (PNP)
L99 - other	EOT & home switches	L01	L04	L07	L10	L13
	EOT switches only	L02	L05	L08	L11	L14
	home switch only	L03	L06	L09	L12	L15

Encoder Options (see page E-71)

E00 - none **E02** - rotary (1000 lines/rev) **E10** - linear (2500 lines/inch) **E99** - other
E01 - rotary (500 lines/rev) **E03** - rotary (1270 lines/rev) **E11** - linear (250 lines/mm)

Power-off Brakes (see page E-70)

B00 - none **B01** - 24 VDC **B02** - 90 VDC **B99** - other

(E) - English Interface	(NPL) - Non Preloaded
(LH) - Left Hand	(PL) - Preloaded
(M) - Metric Interface	(RH) - Right Hand
	(T) - Turcite Nut

Specifications

Load Capacities		Four (4) Bearing Carriage		Six (6) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	7,780 lbs	(3530 kgf)	11,660 lbs	(5280 kgf)
Dynamic Horizontal	50 million inches (1270 km) of travel	2,090 lbs	(948 kgf)	3,135 lbs	(1420 kgf)
Static Horizontal		11,660 lbs	(5290 kgf)	17,500 lbs	(7930 kgf)
Dynamic Roll Moment	2 million inches (50 km) of travel	1,025 ft-lbs	(1390 N-m)	1,540 ft-lbs	(2085 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	275 ft-lbs	(370 N-m)	410 ft-lbs	(555 N-m)
Static Roll Moment		1,830 ft-lbs	(2480 N-m)	2,750 ft-lbs	(3725 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	2,160 ft-lbs	(2925 N-m)	2,235 ft-lbs	(3030 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	580 ft-lbs	(785 N-m)	600 ft-lbs	(810 N-m)
Static Pitch & Yaw Moment		3,860 ft-lbs	(5230 N-m)	3,980 ft-lbs	(5395 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	1,945 lbs	(882 kgf)	1,945 lbs	(882 kgf)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	525 lbs	(238 kgf)	525 lbs	(238 kgf)
Each Bearing Static Load Capacity		2,910 lbs	(1320 kgf)	2,910 lbs	(1320 kgf)
Thrust Force Capacity	10 million screw revolutions	895 lbs	(406 kgf)	895 lbs	(406 kgf)
Thrust Force Capacity	500 million screw revolutions	240 lbs	(109 kgf)	240 lbs	(109 kgf)
Maximum Acceleration		772 in/sec ²	(19,6 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	3.660 in	(92,96 mm)	3.660 in	(92,96 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	9.290 in	(235,97 mm)	4.645 in	(117,98 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.320 in	(33,53 mm)	1.320 in	(33,53 mm)

Other	For Four (4) & Six (6) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages E-30 to E-35)	Acme Screw - Stainless Steel
Screw Material (see pages E-30 to E-35)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00016 in/in (< 4,06 microns/25mm)
Flatness	< 0.00016 in/in (< 4,06 microns/25mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows mounted to carriage & end plates

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kgf)
		A	B	C	M		
17x1206-CP0	6 (150)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	18.5 (8,4)
17x1212-CP0	12 (300)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	20.3 (9,2)
17x1218-CP0	18 (455)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	22.1 (10,2)
17x1224-CP0	24 (605)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	23.9 (10,8)
17x1230-CP0	30 (760)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	25.7 (11,7)
17x1236-CP0	36 (910)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	27.5 (12,5)
17x1242-CP0	42 (1060)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	29.3 (13,3)
17x1248-CP0	48 (1215)	60.125 (1527,2)	64.688 (1643,1)	19	40	64.00 (1626)	31.2 (14,2)
17x1254-CP0	54 (1370)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	33.0 (15,0)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 4 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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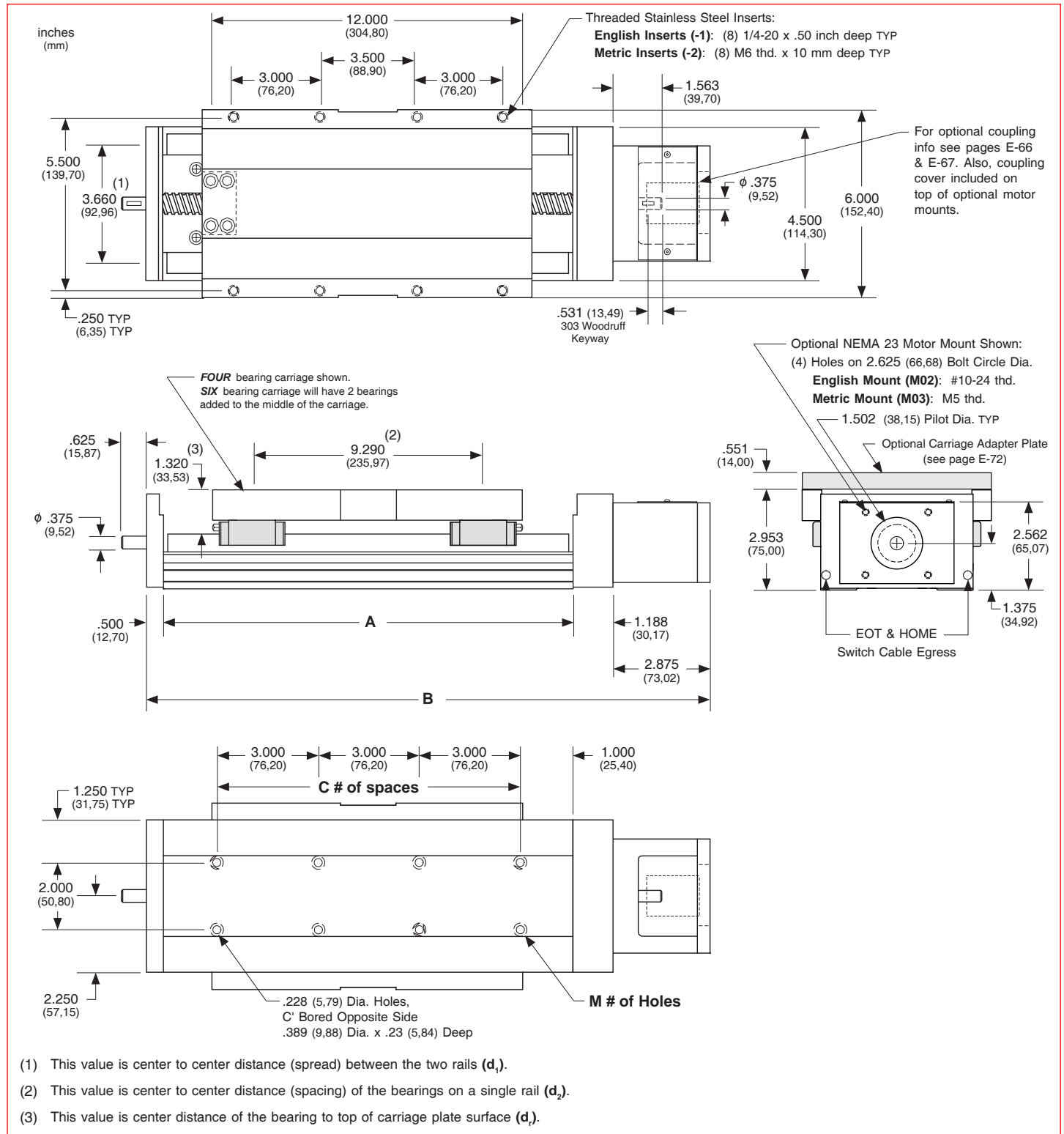
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Specifications subject to change without notice

Dimensions

- Without Cover Plates -



Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight
		A	B	C	M		lbs (kgf)
17x1206-CP1	6 (150)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	19.7 (8,9)
17x1212-CP1	12 (300)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	21.9 (9,9)
17x1218-CP1	18 (455)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	24.1 (10,9)
17x1224-CP1	24 (605)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	26.3 (11,9)
17x1230-CP1	30 (760)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	28.5 (12,9)
17x1236-CP1	36 (910)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	30.7 (13,9)
17x1242-CP1	42 (1060)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	32.9 (14,9)
17x1248-CP1	48 (1215)	60.125 (1527,2)	64.688 (1643,1)	19	40	64.00 (1626)	35.1 (15,9)
17x1254-CP1	54 (1370)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	37.3 (16,9)

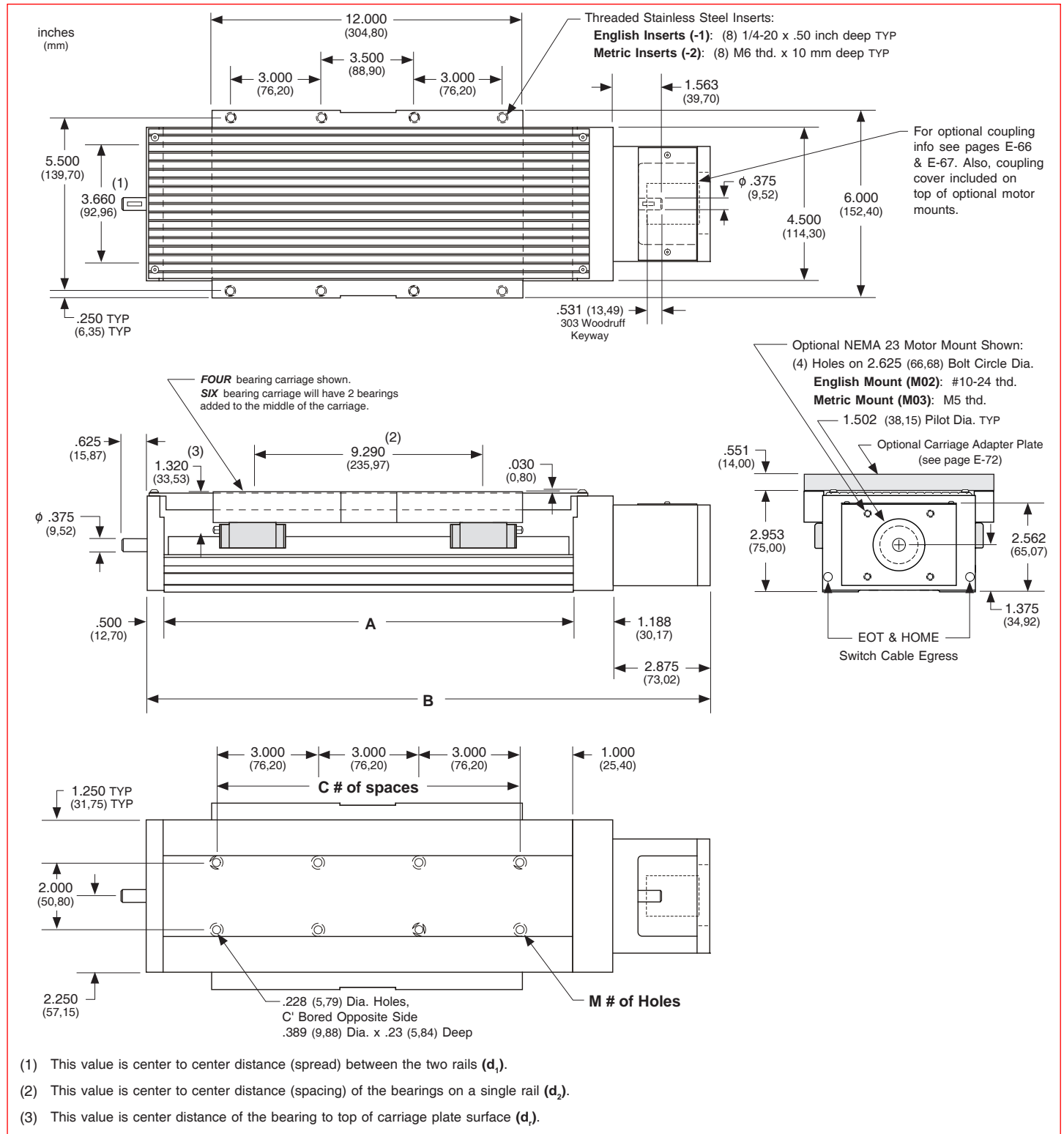
- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 4 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Top Cover Plate Only -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kgf)
		A	B	C	M		
17x1206-CP2	6 (150)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	21.6 (9,8)
17x1212-CP2	12 (300)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	24.2 (11,0)
17x1218-CP2	18 (455)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	26.1 (11,8)
17x1224-CP2	24 (605)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	28.7 (13,1)
17x1230-CP2	30 (760)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	31.3 (14,2)
17x1236-CP2	36 (910)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	34.5 (15,7)
17x1242-CP2	42 (1060)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	37.0 (16,8)
17x1248-CP2	48 (1215)	60.125 (1527,2)	64.688 (1643,1)	19	40	64.00 (1626)	39.6 (18,0)
17x1254-CP2	54 (1370)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	42.1 (19,1)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 4 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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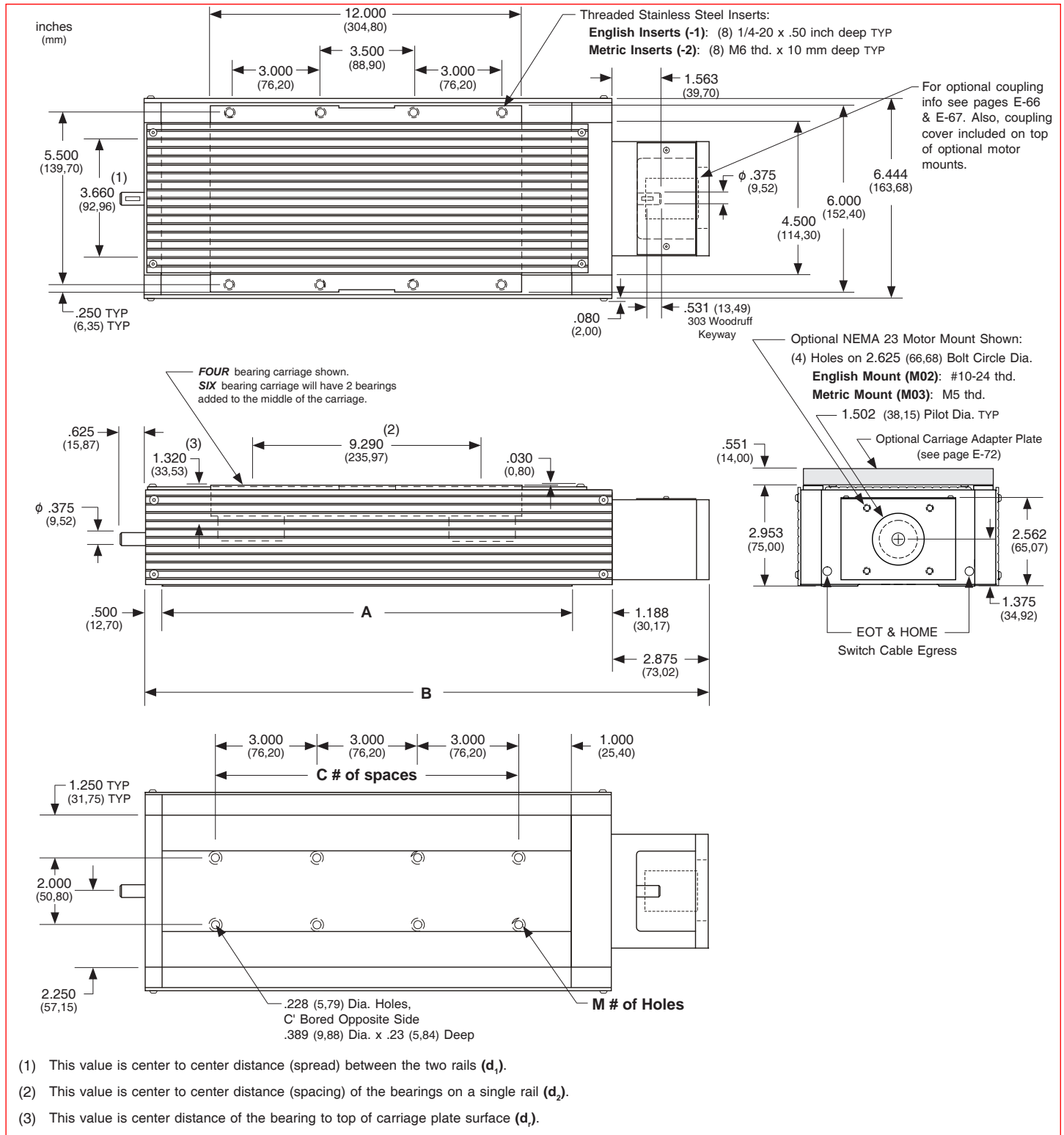
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Dimensions

- With Top & Side Cover Plates -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
17x1203-WC1	3.7 (94)	18.125 (460,4)	22.688 (576,3)	5	12	22.00 (559)	16.8 (7,6)
17x1208-WC1	8.0 (203)	24.125 (612,8)	28.688 (728,7)	7	16	28.00 (711)	18.8 (8,5)
17x1212-WC1	12.8 (444)	30.125 (765,2)	34.688 (881,1)	9	20	34.00 (864)	20.9 (9,5)
17x1217-WC1	17.5 (597)	36.125 (917,6)	40.688 (1033,5)	11	24	40.00 (1016)	22.7 (10,3)
17x1222-WC1	22.0 (555)	42.125 (1070,0)	46.688 (1185,9)	13	28	46.00 (1168)	24.7 (11,2)
17x1228-WC1	28.0 (710)	48.125 (1222,4)	52.688 (1338,3)	15	32	52.00 (1321)	26.7 (12,1)
17x1232-WC1	32.5 (825)	54.125 (1374,8)	58.688 (1490,7)	17	36	58.00 (1473)	28.7 (13,0)
17x1237-WC1	37.0 (935)	60.125 (1527,2)	64.688 (1643,1)	21	44	64.00 (1626)	30.9 (14,0)
17x1241-WC1	41.5 (1050)	66.125 (1679,6)	70.688 (1795,5)	21	44	70.00 (1778)	33.0 (15,0)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.42 lbs (0,19 kg)], a C100 style [0.09 lbs (0,04 kg)] coupling, and a 2 bearing carriage. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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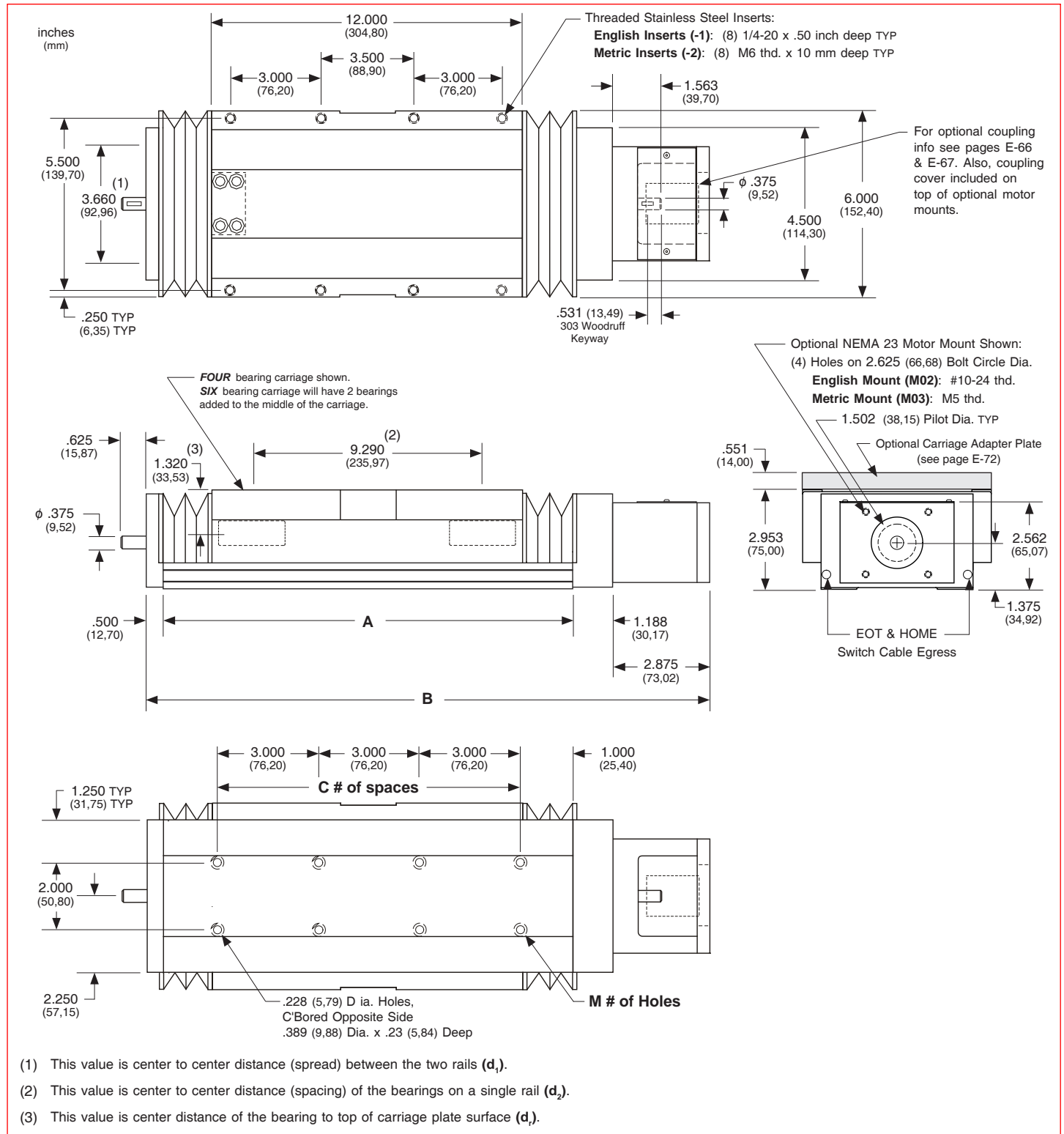
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Dimensions

- With Waycovers -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page E-29 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

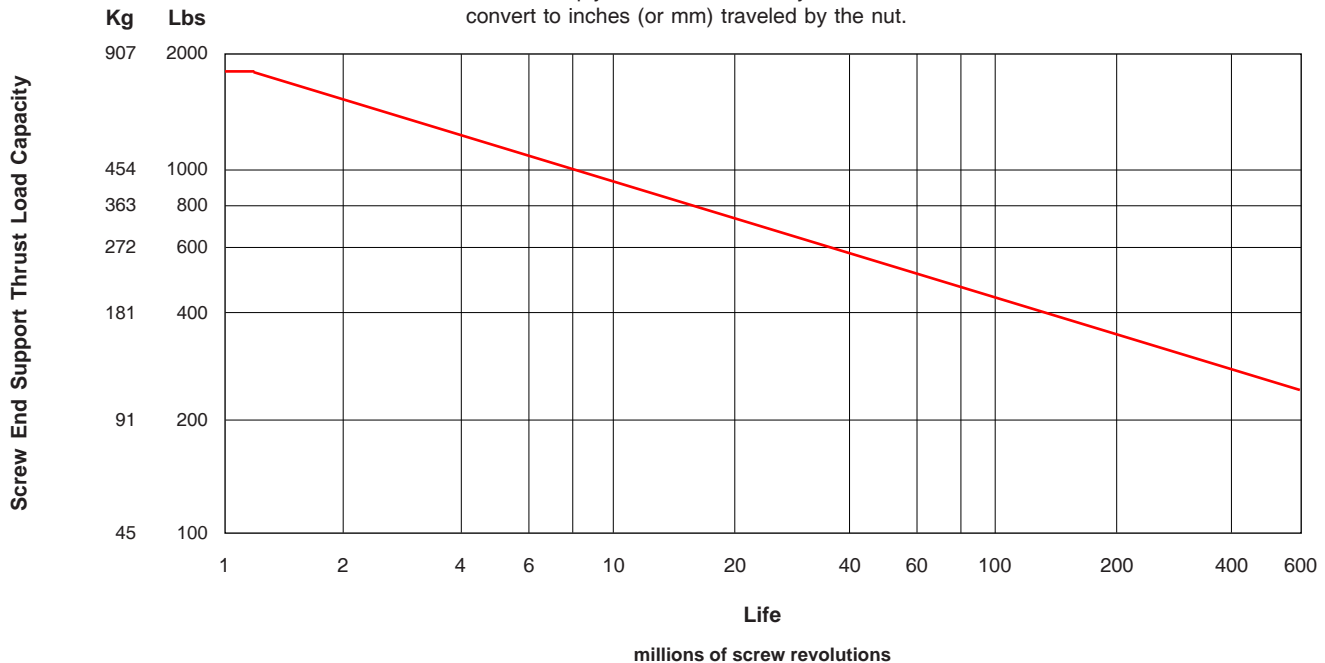
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	1,725 (782)	1,725 (782)	1,530 (694)	895 (406)	525 (238)	415 (188)	240 (109)

Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page E-28 for load/life capacity of the screw end support bearings.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

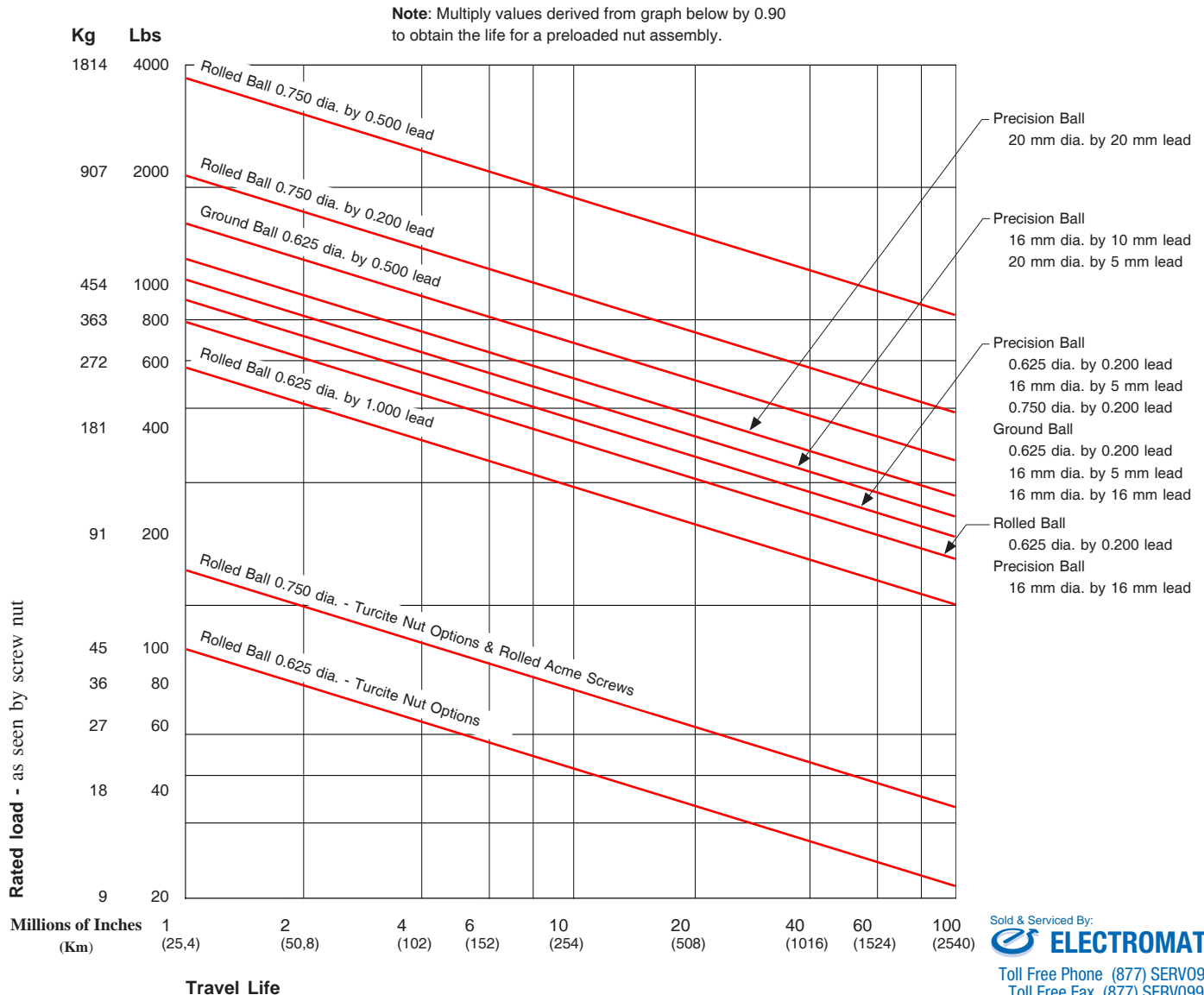
- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages E-33 to E-35)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$



Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 160 & 170 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Screws - Acme & Ball

160-CP0 series 170-CP0 series 170-CP1 series 170-CP2 series		170-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)						
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw						
				0.625 dia. 0.100 lead	0.625 dia. 0.200 lead	0.625 dia. 0.500 lead	0.625 dia. 1.000 lead	16 mm dia. 5 mm lead	16 mm dia. 10 mm lead	16 mm dia. 16 mm lead
1xx606	6 (150)	17x603	3.7 (94)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
1xx612	12 (300)	17x608	8.0 (203)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
1xx1206	6 (150)	17x1203	3.7 (94)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
1xx618	18 (455)	17x612	12.8 (325)	4.7 (119)	9.5 (241)	23.7 (602)	47.3 (1201)	9.2 (234)	18.5 (470)	29.6 (752)
1xx1212	12 (300)	17x1208	8.0 (203)	4.7 (119)	9.5 (241)	23.7 (602)	47.3 (1201)	9.2 (234)	18.5 (470)	29.6 (752)
1xx624	24 (605)	17x617	17.5 (444)	3.2 (81)	6.4 (162)	16.0 (406)	32.1 (815)	6.3 (160)	12.5 (317)	20.0 (508)
1xx1218	18 (455)	17x1212	12.8 (325)	3.2 (81)	6.4 (162)	16.0 (406)	32.1 (815)	6.3 (160)	12.5 (317)	20.0 (508)
1xx630	30 (760)	17x622	22.0 (555)	2.3 (58)	4.6 (117)	11.6 (295)	23.2 (589)	4.5 (114)	9.0 (229)	14.5 (368)
1xx1224	24 (605)	17x1217	17.5 (444)	2.3 (58)	4.6 (117)	11.6 (295)	23.2 (589)	4.5 (114)	9.0 (229)	14.5 (368)
1xx636	36 (910)	17x628	28.0 (710)	1.7 (43)	3.5 (89)	8.8 (223)	17.5 (444)	3.4 (86)	6.8 (173)	10.9 (277)
1xx1230	30 (760)	17x1222	22.0 (555)	1.7 (43)	3.5 (89)	8.8 (223)	17.5 (444)	3.4 (86)	6.8 (173)	10.9 (277)
1xx642	42 (1060)	17x632	32.5 (825)	1.4 (35)	2.7 (68)	6.9 (175)	13.7 (348)	2.7 (69)	5.3 (135)	8.6 (218)
1xx1236	36 (910)	17x1228	28.0 (710)	1.4 (35)	2.7 (68)	6.9 (175)	13.7 (348)	2.7 (69)	5.3 (135)	8.6 (218)
1xx648	48 (1215)	17x637	37.0 (935)	1.1 (28)	2.2 (56)	5.5 (140)	11.0 (279)	2.1 (53)	4.3 (109)	6.9 (175)
1xx1242	42 (1060)	17x1232	32.5 (825)	1.1 (28)	2.2 (56)	5.5 (140)	11.0 (279)	2.1 (53)	4.3 (109)	6.9 (175)
1xx654	54 (1370)	17x641	41.5 (1050)	0.9 (23)	1.8 (46)	4.5 (114)	9.0 (228)	1.7 (43)	3.5 (89)	5.6 (142)
1xx1248	48 (1215)	17x1237	37.0 (935)	0.9 (23)	1.8 (46)	4.5 (114)	9.0 (228)	1.7 (43)	3.5 (89)	5.6 (142)
1xx660	60 (1520)	17x647	47.5 (1205)	0.7 (18)	1.5 (38)	3.8 (96)	7.6 (193)	1.5 (38)	2.9 (74)	4.7 (119)
1xx1254	54 (1370)	17x1241	41.5 (1050)	0.7 (18)	1.5 (38)	3.8 (96)	7.6 (193)	1.5 (38)	2.9 (74)	4.7 (119)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

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Screws - Acme & Ball

160-CP0 series 170-CP0 series 170-CP1 series 170-CP2 series		170-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾			
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	in/sec (mm/sec)			
				Screw			
				0.750 dia. 0.200 lead	0.750 dia. 0.500 lead	20 mm dia. 5 mm lead	20 mm dia. 20 mm lead
1xx606	6 (150)	17x603	3.7 (94)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
1xx612	12 (300)	17x608	8.0 (203)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
1xx1206	6 (150)	17x1203	3.7 (94)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
1xx618	18 (455)	17x612	12.8 (325)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
1xx1212	12 (300)	17x1208	8.0 (203)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
1xx624	24 (605)	17x617	17.5 (444)	7.7 (196)	19.2 (488)	7.6 (193)	30.4 (772)
1xx1218	18 (455)	17x1212	12.8 (325)	7.7 (196)	19.2 (488)	7.6 (193)	30.4 (772)
1xx630	30 (760)	17x622	22.0 (555)	5.5 (140)	13.9 (353)	5.5 (140)	21.9 (556)
1xx1224	24 (605)	17x1217	17.5 (444)	5.5 (140)	13.9 (353)	5.5 (140)	21.9 (556)
1xx636	36 (910)	17x628	28.0 (710)	4.2 (107)	10.5 (267)	4.1 (104)	16.6 (422)
1xx1230	30 (760)	17x1222	22.0 (555)	4.2 (107)	10.5 (267)	4.1 (104)	16.6 (422)
1xx642	42 (1060)	17x632	32.5 (825)	3.3 (84)	8.2 (208)	3.2 (81)	13.0 (330)
1xx1236	36 (910)	17x1228	28.0 (710)	3.3 (84)	8.2 (208)	3.2 (81)	13.0 (330)
1xx648	48 (1215)	17x637	37.0 (935)	2.6 (66)	6.6 (168)	2.6 (66)	10.4 (264)
1xx1242	42 (1060)	17x1232	32.5 (825)	2.6 (66)	6.6 (168)	2.6 (66)	10.4 (264)
1xx654	54 (1370)	17x641	41.5 (1050)	2.1 (53)	5.4 (137)	2.0 (50)	8.5 (216)
1xx1248	48 (1215)	17x1237	37.0 (935)	2.1 (53)	5.4 (137)	2.0 (50)	8.5 (216)
1xx660	60 (1520)	17x647	47.5 (1205)	1.8 (46)	4.5 (114)	1.8 (46)	7.2 (183)
1xx1254	54 (1370)	17x1241	41.5 (1050)	1.8 (46)	4.5 (114)	1.8 (46)	7.2 (183)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

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Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S005)	800 (363)	6,150 (2790)	90	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S006)	720 (326)	6,070 (2753)		20 (0,14)			
	<i>Non-preloaded</i> Turcite Nut (S007)	100 (45)	800 (363)	60	15 (0,11)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S008)	90 (41)	800 (363)		30 (0,21)	0		+ 0.0002 to - 0.0002 (5) (5)
0.625 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S009)	590 (267)	2,425 (1100)	90	25 (0,18)	< 0.004 (100)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S010)	530 (240)	2,390 (1084)		40 (0,28)			
	<i>Non-preloaded</i> Turcite Nut (S011)	100 (45)	800 (363)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S012)	90 (41)	800 (363)		60 (0,42)	0		+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S013)	1,900 (862)	18,800 (8527)	90	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S014)	1,710 (776)	18,610 (8441)		30 (0,21)			
	<i>Non-preloaded</i> Turcite Nut (S015)	195 (88)	1,500 (680)	60	25 (0,18)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S016)	175 (79)	1,500 (680)		40 (0,28)	0		+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S017)	3,450 (1565)	24,200 (10977)	90	25 (0,18)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S018)	3,150 (1429)	23,855 (10820)		40 (0,28)			
	<i>Non-preloaded</i> Turcite Nut (S019)	195 (88)	1,500 (680)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S020)	175 (79)	1,500 (680)		60 (0,42)	0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.675 inch (17,1 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all (-CP0), (-CP1), and (-CP2) model versions with a 6 inch carriage. All the model numbers with (-WC1) and 12 inch carriages are not affected.

Screws - Acme & Ball

SCREW		PRECISION BALL SCREWS							Bidirectional Repeatability inches (microns)	
		Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)		
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S114)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S115)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 5 mm lead	<i>Non-preloaded</i> (S116)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S117)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 10 mm lead	<i>Non-preloaded</i> (S118)	1,080 (489)	2,630 (1192)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S119)	972 (440)	2,365 (1072)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 16 mm lead	<i>Non-preloaded</i> (S120)	819 (371)	1,620 (734)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S121)	737 (334)	1,455 (659)		35 (0,24)		0		+ 0.0002 to - 0.0002 (5) (5)	
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S122)	964 (437)	3,360 (1524)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S123)	867 (393)	3,025 (1372)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
20 mm dia. 5 mm lead	<i>Non-preloaded</i> (S124)	1,070 (485)	3,990 (1809)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S125)	960 (435)	3,590 (1628)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
20 mm dia. 20 mm lead	<i>Non-preloaded</i> (S128)	1,293 (586)	3,505 (1589)	90	25 (0,18)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S129)	1,160 (526)	3,150 (1428)		40 (0,28)		0		+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

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Screws - Acme & Ball

SCREW	GROUND BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 dia., 0.200 lead (2) <i>Preloaded</i> (S212)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5)
0.625 dia., 0.500 lead (2) <i>Preloaded</i> (S213)	1430 (649)	4,191 (1901)	90	30 (0,21)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5)
16 mm dia., 5 mm lead (2) <i>Preloaded</i> (S214)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5)
16 mm dia., 16 mm lead (2) <i>Preloaded</i> (S215)	910 (412)	1,800 (816)	90	35 (0,24)	< 0.002 (50)	0	+/- 0.0002 (5)	+ 0.0002 to - 0.0002 (5)

SCREW	ROLLED ACME SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
0.625 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S300)	160 (73)	800 (363)	40	10 (0,07)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5)
	<i>Preloaded</i> (S301)	140 (64)	720 (327)		20 (0,14)	< 0.003 (75)		0
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S302)	160 (73)	800 (363)	40	15 (0,11)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5)
	<i>Preloaded</i> (S303)	140 (64)	720 (327)		30 (0,21)	< 0.003 (75)		0

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) The 0.625 inch & 16 mm diameter Ground Ball Screw options are only available in travel lengths where the screw length is less than 47 inches (1194 mm).

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- ❑ General Automation

Quality Construction

LINTECH's 180 series tables are designed to handle light to heavy loads at very high speeds. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on precision ground linear rails. The linear rails are mounted to an aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. The drive system uses two pulleys, along with a high strength, steel reinforced polyurethane belt, which provides 3.543 inches (90 mm) of linear movement per revolution of the input shaft. The simple belt tensioning system allows for easy adjustment of belt tension by the user. NEMA 23 & 34 motor mounts, or gearhead mounts are available as well as planetary gearheads.



Available Options

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Cover Plates and Waycovers

For harsh environmental conditions, or for operator protection, these tables can be fitted with either aluminum cover plates, or waycovers. The entire length of the belt and linear bearing system will be covered.

End of Travel and Home Switches

The 180 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Motor Adapter Brackets

NEMA 34 or any metric mount motor can be mounted to a 180 series positioning table with the use of adapter brackets.

Rotary Encoders

Incremental rotary encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Planetary Gearheads

LINTECH provides planetary gearheads which can be used with a 180 series. These gearheads are provided in either an in-line or right angle version, with standard gear ratios of 1:1, 2:1 & 3:1. Gearheads may be required for applications which have a large mismatch of load to motor inertias. They also help reduce the torque required from the motor for a particular application.

Other

The 180 series tables can accommodate **chrome plated linear bearings & rails** for corrosive environment applications and **power-off electric brakes** for load locking applications.

Standard Features - 180 Series

- ❑ Compact 6.0 inches (152 mm) wide by 2.953 inches (75 mm) tall
- ❑ Travel lengths from 6 inches (150 mm) to 108 inches (2740 meters)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ Polyurethane belt with high strength steel tension members
- ❑ 0° F to +176° F (-18° C to +80° C) operating temperature
- ❑ Single screw belt tensioning with self locking thread
- ❑ Dynamic Load Capacity to 5,600 lbs (2540 kg)
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design
- ❑ 2 rails; 2, 4, or 6 bearing carriages

180-CP0 Series



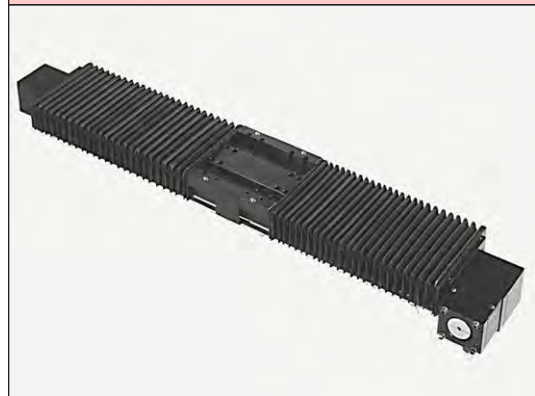
Options - 180 Series

- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via our Website
- ❑ Adapter brackets for non-NEMA motors
- ❑ Chrome plated linear bearings & rails
- ❑ Rotary incremental encoders
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Carriage adapter plates
- ❑ Planetary gearheads
- ❑ Motor couplings

180-CP1 Series



180-WC1 Series



180-CP2 Series



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18 **4** **6** **004** - **CP1** - **1** - **D1** - **M02** - **C155** - **L04** - **E00** - **B00**

Table Series

Number of Bearings

- 2** - 2 bearings per carriage
- 4** - 4 bearings per carriage

Carriage Length

- 6** - 6 inches

Travel Length (see pages E-40, E-42, E-44 & E-46)

- 003** - 3 to 108 inches

Cover Plate

- CP0** - no cover plates
- CP1** - top cover plate only
- CP2** - top & side cover plates
- WC1** - waycovers

Carriage Inserts (see pages E-41, E-43, E-45, & E-47)

- 1** - English mount
- 2** - Metric mount

Drive Shaft (see pages E-41, E-43, E-45 & E-47)

- D1** - Right Hand single shaft
- D2** - Left Hand single shaft
- D3** - Right Hand thru shaft
- D4** - Left Hand thru shaft

Motor Mount (see pages E-41, E-43, E-45, E-47 & E-68)

- M00** - none
- M99** - other
- M02** - NEMA 23 mount (E)
- M03** - NEMA 23 mount (M)
- M04** - NEMA 34 mount (E)
- M05** - NEMA 34 mount (M)

Coupling Options (see pages E-66 & E-67)

- C000** - none
- C999** - none
- C130 to C136** - H100
- C155 to C184** - H131
- C190 to C200** - H163
- C407 to C415** - G100
- C435 to C464** - G126
- C470 to C480** - G158

Limit & Home Switches (see pages E-63 to E-65)

- | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|
| L00 - no switches | | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L04 | L07 | L10 | L13 |
| | EOT switches only | L05 | L08 | L11 | L14 |
| | home switch only | L06 | L09 | L12 | L15 |

Encoder Options (see page E-71)

- E00** - none
- E01** - rotary (500 lines/rev)
- E02** - rotary (1000 lines/rev)
- E03** - rotary (1270 lines/rev)
- E99** - other

note: When selecting any rotary encoder option, the Drive Shaft D3 or D4 above is required.

Power-off Brakes (see page E-70)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other

note: When selecting any brake option, the Drive Shaft D3 or D4 above is required.

(E) - English Interface
(M) - Metric Interface

Specifications

Load Capacities		Two (2) Bearing Carriage		Four (4) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	3,890 lbs	(1765 kg)	7,780 lbs	(3530 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	1,045 lbs	(474 kg)	2,090 lbs	(948 kg)
Static Horizontal		5,830 lbs	(2645 kg)	11,660 lbs	(5290 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	510 ft-lbs	(690 N-m)	1,025 ft-lbs	(1390 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	137 ft-lbs	(185 N-m)	275 ft-lbs	(370 N-m)
Static Roll Moment		915 ft-lbs	(1240 N-m)	1,830 ft-lbs	(2480 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	71 ft-lbs	(96 N-m)	930 ft-lbs	(1260 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	19 ft-lbs	(26 N-m)	250 ft-lbs	(339 N-m)
Static Pitch & Yaw Moment		126 ft-lbs	(170 N-m)	1,670 ft-lbs	(2260 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	1,945 lbs	(882 kg)	1,945 lbs	(882 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	525 lbs	(238 kg)	525 lbs	(238 kg)
Each Bearing Static Load Capacity		2,910 lbs	(1320 kg)	2,910 lbs	(1320 kg)
Maximum Belt Tensile Force		350 lbs	(159 kg)	350 lbs	(159 kg)
Maximum Carriage Thrust Force		230 lbs	(104 kg)	230 lbs	(104 kg)
Maximum Speed		118 in/sec	(3 m/sec)	118 in/sec	(3 m/sec)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	3.660 in	(92,96 mm)	3.660 in	(92,96 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	3.290 in	(83,57 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.320 in	(33,53 mm)	1.320 in	(33,53 mm)

Other	For Two (2) & Four (4) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Belt Properties	Black, 32 mm wide, Polyurethane, Steel reinforced belt
Drive Pulley Weight	0.39 lbs (0,18 kg)
Drive Pulley Diameter	1.128 in (28,65 mm)
Drive Lead	3.543 in (90,00 mm)
Belt Stretch - x Load (lbs or N)	0.00011 in/ft per lbs (0,00212 mm/m per N)
Unidirectional Repeatability	+/- 0.001 in (+/- 0,0254 mm)
Bidirectional Repeatability	+/- 0.004 in (+/- 0,1016 mm)
Position Accuracy (Belt) ⁽¹⁾	< 0.010 in/ft (< 0,254 mm/300mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Breakaway Torque	< 75 oz-in (0,530 N-m)
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, and Gearheads
Coupling	Two (2) different styles available
Waycover Material	Hypilon Polyester Bellows mounted to carriage & end plates

Footnotes:

(1) Position accuracy varies based on belt stretch. The given rating is based upon a carriage speed of 5 inches/sec (127 mm/sec) and a no load condition.

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
18x6006-CP0	6 (150)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	17.4 (7,9)
18x6012-CP0	12 (300)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	19.6 (8,9)
18x6018-CP0	18 (455)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	21.8 (9,9)
18x6024-CP0	24 (605)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	24.0 (10,9)
18x6030-CP0	30 (760)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	26.2 (11,9)
18x6036-CP0	36 (910)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	28.4 (12,9)
18x6042-CP0	42 (1060)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	30.6 (13,9)
18x6048-CP0	48 (1215)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	32.8 (14,9)
18x6054-CP0	54 (1370)	60.125 (1527,1)	66.250 (1682,7)	19	40	15.8 (0,45)	35.0 (15,9)
18x6060-CP0	60 (1520)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	37.2 (16,9)
18x6072-CP0	72 (1825)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	41.6 (18,9)
18x6084-CP0	84 (2130)	90.125 (2289,2)	96.250 (2444,8)	29	60	23.3 (0,66)	46.0 (20,9)
18x6096-CP0	96 (2435)	102.125 (2594,0)	108.250 (2749,6)	33	68	26.3 (0,75)	50.4 (22,9)
18x6108-CP0	108 (2740)	114.125 (2898,8)	120.250 (3054,4)	37	76	29.3 (0,83)	54.8 (24,9)

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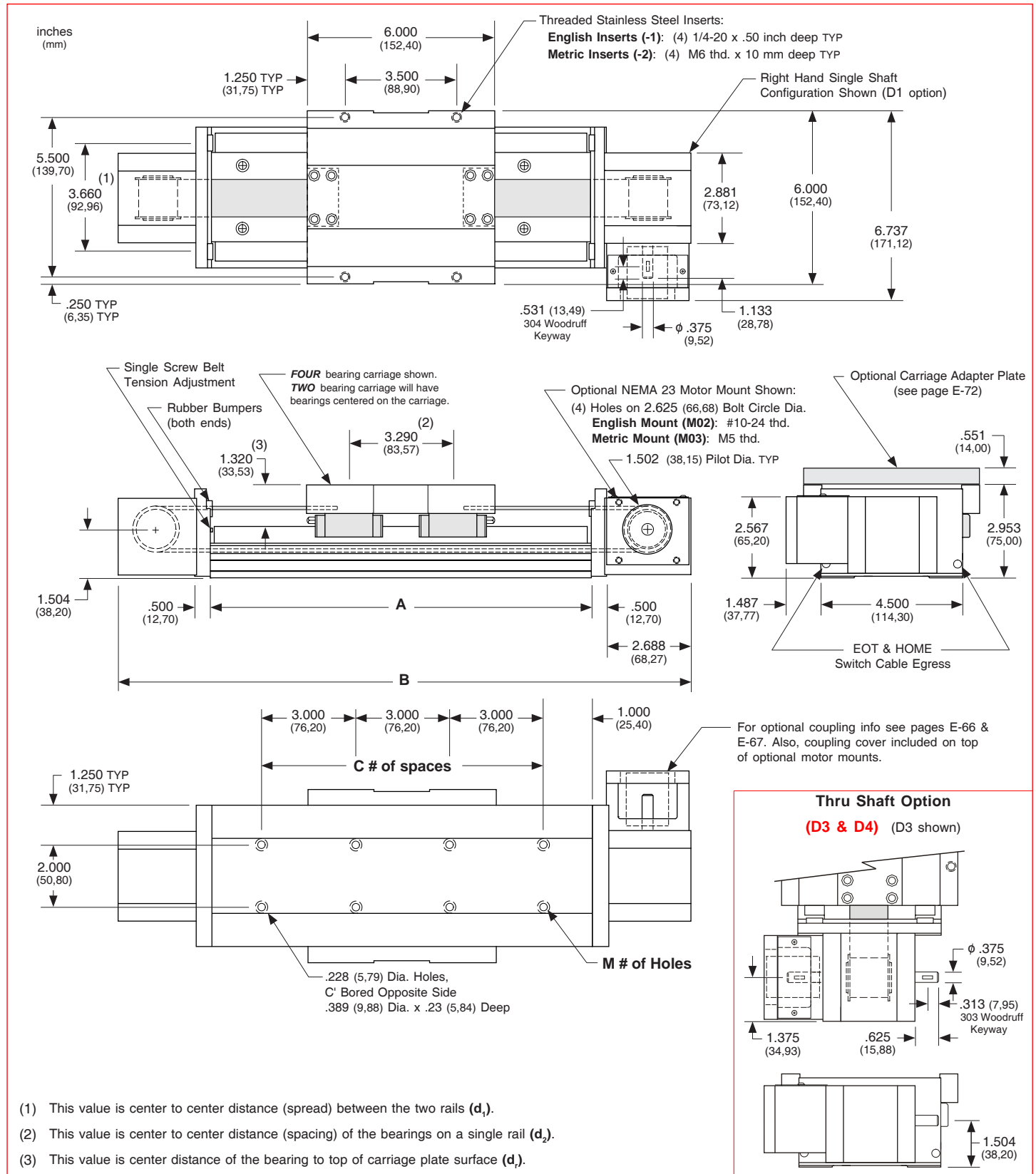
 x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
 x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 2 bearing carriage [2.5 lbs (1,13 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- Without Cover Plates -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel ⁽¹⁾ Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table ⁽²⁾ Weight lbs (kg)
		A	B	C	M		
18x6006-CP1	6 (150)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	18.2 (8,3)
18x6012-CP1	12 (300)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	20.8 (9,4)
18x6018-CP1	18 (455)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	23.4 (10,6)
18x6024-CP1	24 (605)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	26.0 (11,8)
18x6030-CP1	30 (760)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	28.6 (13,0)
18x6036-CP1	36 (910)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	31.2 (14,2)
18x6042-CP1	42 (1060)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	33.8 (15,3)
18x6048-CP1	48 (1215)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	36.4 (16,5)
18x6054-CP1	54 (1370)	60.125 (1527,1)	66.250 (1682,7)	19	40	15.8 (0,45)	39.0 (17,7)
18x6060-CP1	60 (1520)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	41.6 (18,9)

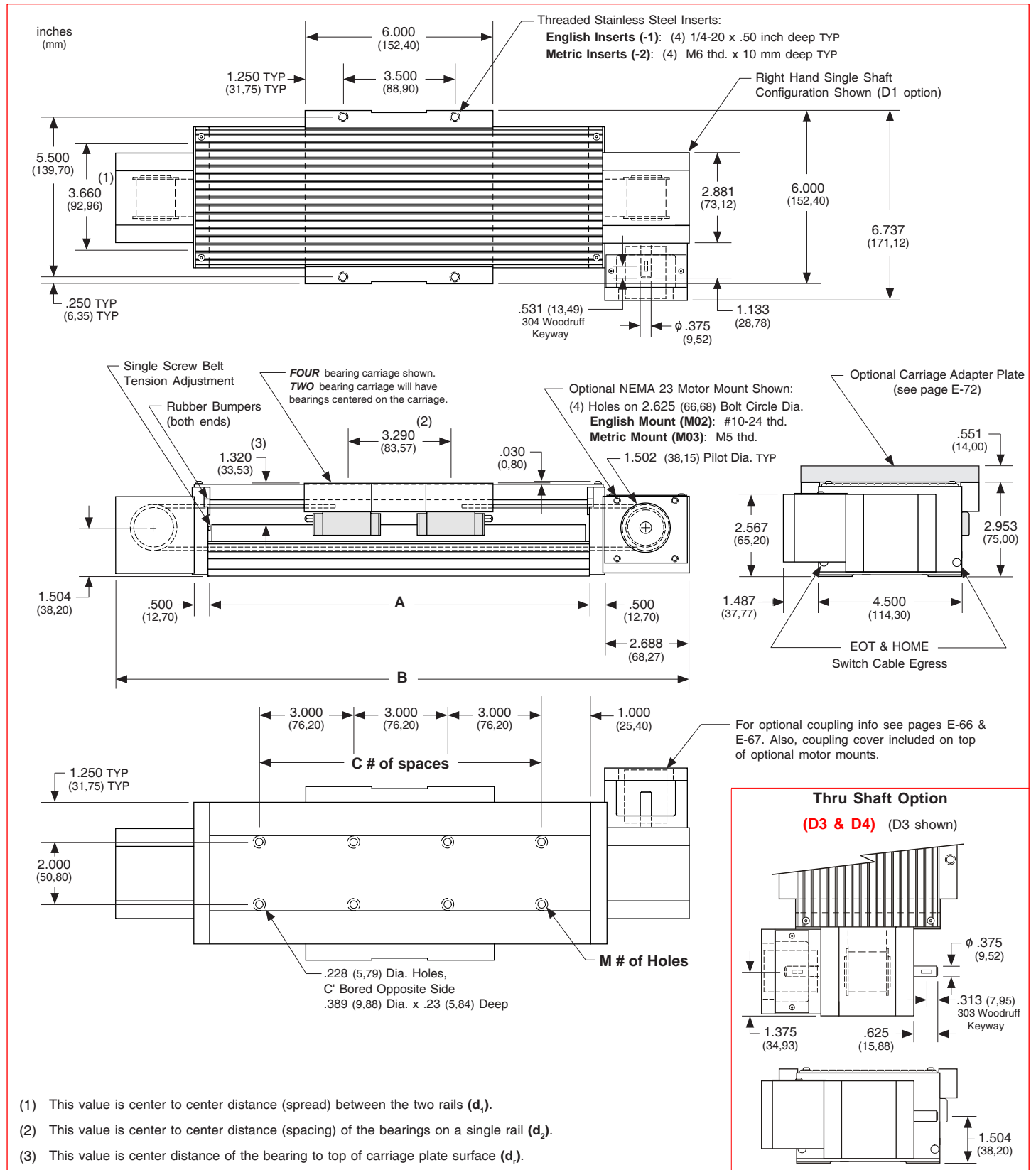
- x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

- (1) For travels greater than 60 inches (1520 mm) a top cover plate (-CP1) cannot be used due to the sag of the cover plate.
- (2) Weight shown is with a 2 bearing carriage [2.5 lbs (1,13 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Top Cover Plate Only -



- (1) This value is center to center distance (spread) between the two rails (d_1).
- (2) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (3) This value is center distance of the bearing to top of carriage plate surface (d_3).

Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length ⁽¹⁾ inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table Weight ⁽²⁾ lbs (kg)
		A	B	C	M		
18x6006-CP2	6 (150)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	19.8 (9,0)
18x6012-CP2	12 (300)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	22.7 (10,3)
18x6018-CP2	18 (455)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	25.7 (11,7)
18x6024-CP2	24 (605)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	28.7 (13,0)
18x6030-CP2	30 (760)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	31.6 (14,3)
18x6036-CP2	36 (910)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	34.6 (15,7)
18x6042-CP2	42 (1060)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	37.6 (17,1)
18x6048-CP2	48 (1215)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	40.5 (18,4)
18x6054-CP2	54 (1370)	60.125 (1527,1)	66.250 (1682,7)	19	40	15.8 (0,45)	43.5 (19,7)
18x6060-CP2	60 (1520)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	46.4 (21,0)
18x6072-CP2 ⁽¹⁾	72 (1825)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	47.2 (21,4)
18x6084-CP2 ⁽¹⁾	84 (2130)	90.125 (2289,2)	96.250 (2444,8)	29	60	23.3 (0,66)	52.4 (23,8)
18x6096-CP2 ⁽¹⁾	96 (2435)	102.125 (2594,0)	108.250 (2749,6)	33	68	26.3 (0,75)	57.6 (26,1)
18x6108-CP2 ⁽¹⁾	108 (2740)	114.125 (2898,8)	120.250 (3054,4)	37	76	29.3 (0,83)	62.8 (28,5)

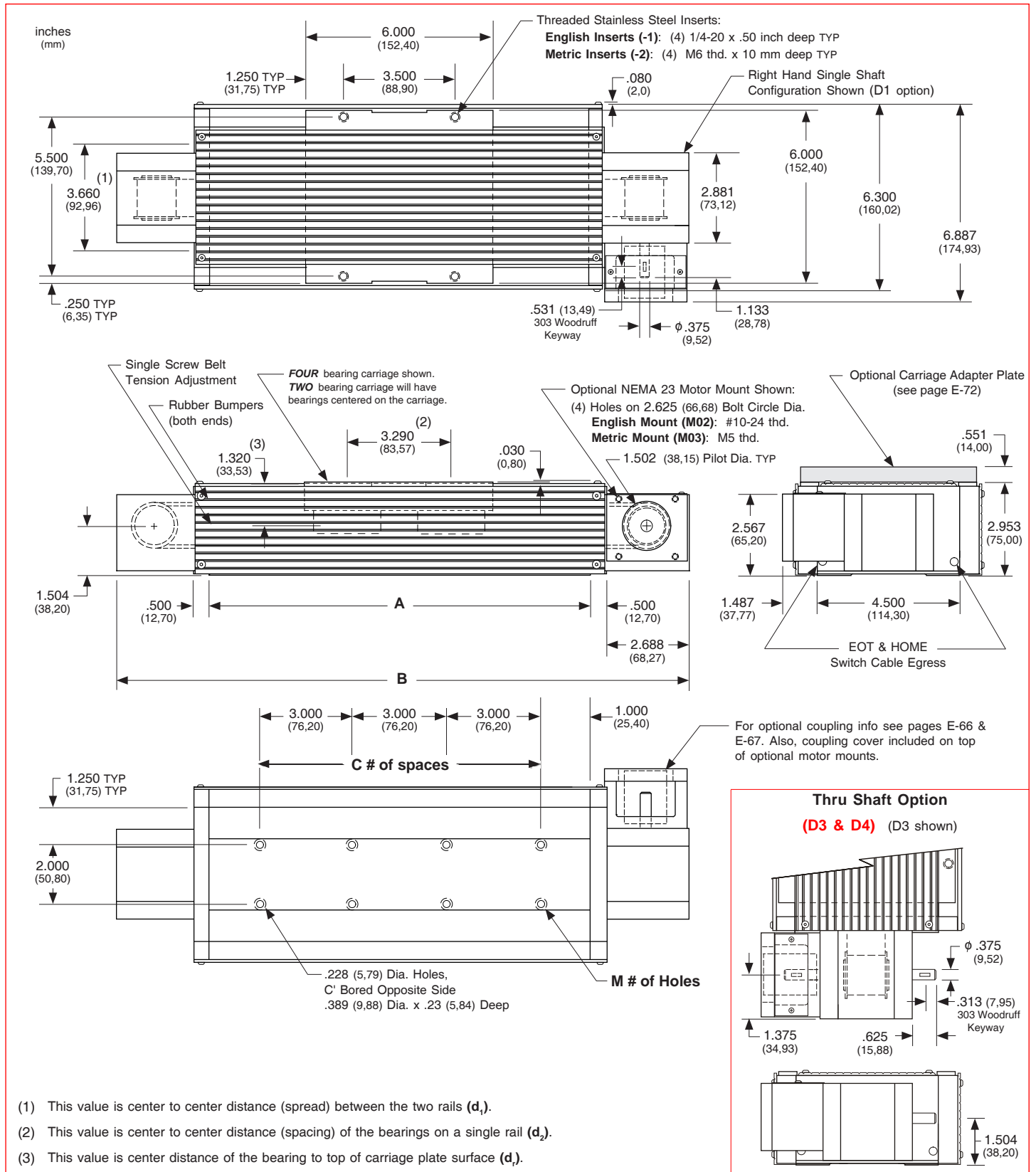
- ┌ x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- └ x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

- (1) For travels greater than 60 inches (1520 mm) the top cover plate cannot be used due to the sag of the cover plate. Just the two side cover plates are installed.
- (2) Weight shown is with a 2 bearing carriage [2.5 lbs (1,13 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Top & Side Cover Plates -



Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
18x6003-WC1	3.7 (94)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	18.0 (8,2)
18x6008-WC1	8.0 (203)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	20.4 (9,3)
18x6012-WC1	12.8 (325)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	22.8 (10,3)
18x6017-WC1	17.5 (444)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	25.3 (11,5)
18x6022-WC1	22.0 (555)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	27.5 (12,7)
18x6028-WC1	28.0 (710)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	29.9 (13,6)
18x6032-WC1	32.5 (825)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	32.3 (14,7)
18x6037-WC1	37.0 (935)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	34.7 (15,7)
18x6041-WC1	41.5 (1050)	60.125 (1527,1)	66.250 (1682,7)	19	40	15.8 (0,45)	37.2 (16,9)
18x6047-WC1	47.5 (1205)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	39.8 (18,1)
18x6056-WC1	56.7 (1440)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	45.0 (20,4)
18x6065-WC1	65.5 (1660)	90.125 (2289,2)	96.250 (2444,8)	29	60	23.3 (0,66)	50.2 (22,8)
18x6074-WC1	74.5 (1890)	102.125 (2594,0)	108.250 (2749,6)	33	68	26.3 (0,75)	55.4 (25,1)
18x6084-WC1	84.0 (2130)	114.125 (2898,8)	120.250 (3054,4)	37	76	29.3 (0,83)	60.6 (27,5)

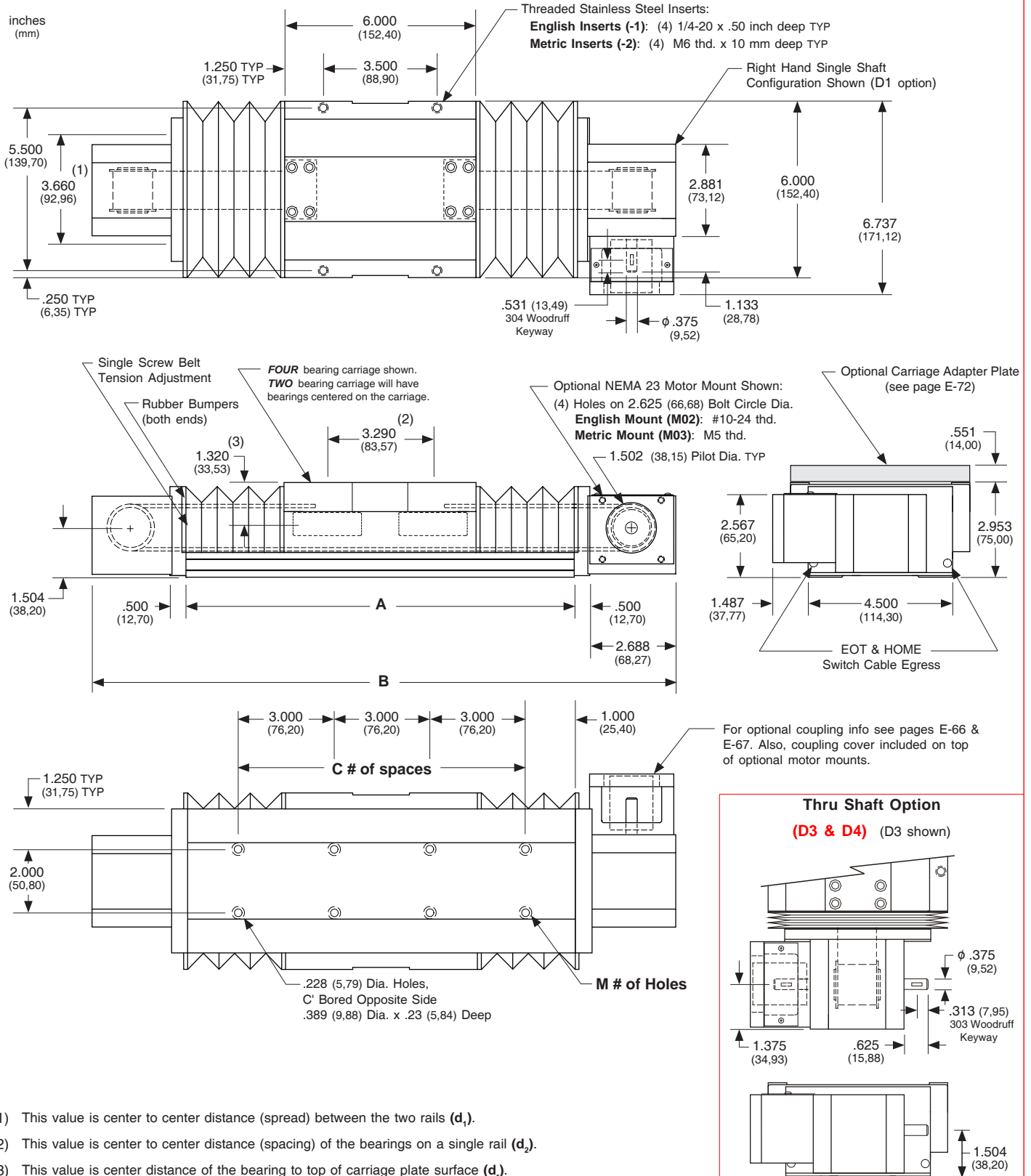
- ┌ x = 2; Carriage has 2 bearings; Carriage weight = 2.5 lbs. (1,13 kg)
- └ x = 4; Carriage has 4 bearings; Carriage weight = 3.3 lbs. (1,50 kg)

Footnotes:

(1) Weight shown is with a 2 bearing carriage [2.5 lbs (1,13 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 4 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Waycovers -



18 - **4** - **12** - **004** - **CP1** - **1** - **D1** - **M02** - **C155** - **L04** - **E00** - **B00**

Table Series

Number of Bearings

- 4 - 4 bearings per carriage
- 6 - 6 bearings per carriage

Carriage Length

- 12 - 6 inches

Travel Length (see pages E-50, E-52, E-54 & E-56)

- 003 - 3 to 108 inches

Cover Plate

- CP0 - no cover plates
- CP1 - top cover plate only
- CP2 - top & side cover plates
- WC1 - waycovers

Carriage Inserts (see pages E-51, E-53, E-55, & E-57)

- 1 - English mount
- 2 - Metric mount

Drive Shaft (see pages E-51, E-53, E-55 & E-57)

- D1 - Right Hand single shaft
- D2 - Left Hand single shaft
- D3 - Right Hand thru shaft
- D4 - Left Hand thru shaft

Motor Mount (see pages E-51, E-53, E-55, E-57 & E-68)

- M00 - none
- M99 - other
- M02 - NEMA 23 mount (E)
- M03 - NEMA 23 mount (M)
- M04 - NEMA 34 mount (E)
- M05 - NEMA 34 mount (M)

Coupling Options (see pages E-66 & E-67)

- C000 - none
- C999 - none
- C130 to C136 - H100
- C155 to C184 - H131
- C190 to C200 - H163
- C407 to C415 - G100
- C435 to C464 - G126
- C470 to C480 - G158

Limit & Home Switches (see pages E-63 to E-65)

- | | | | | | |
|-------------------|---------------------|------|------|------------|------------|
| L00 - no switches | | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L04 | L07 | L10 | L13 |
| | EOT switches only | L05 | L08 | L11 | L14 |
| | home switch only | L06 | L09 | L12 | L15 |

Encoder Options (see page E-71)

- E00 - none
- E01 - rotary (500 lines/rev)
- E02 - rotary (1000 lines/rev)
- E03 - rotary (1270 lines/rev)
- E99 - other

note: When selecting any rotary encoder option, the Drive Shaft D3 or D4 above is required.

Power-off Brakes (see page E-70)

- B00 - none
- B01 - 24 VDC
- B02 - 90 VDC
- B99 - other

note: When selecting any brake option, the Drive Shaft D3 or D4 above is required.

(E) - English Interface
(M) - Metric Interface

Specifications

Load Capacities		Four (4) Bearing Carriage		Six (6) Bearing Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	7,780 lbs	(3530 kgf)	11,660 lbs	(5280 kgf)
Dynamic Horizontal	50 million inches (1270 km) of travel	2,090 lbs	(948 kgf)	3,135 lbs	(1420 kgf)
Static Horizontal		11,660 lbs	(5290 kgf)	17,500 lbs	(7930 kgf)
Dynamic Roll Moment	2 million inches (50 km) of travel	1,025 ft-lbs	(1390 N-m)	1,540 ft-lbs	(2085 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	275 ft-lbs	(370 N-m)	410 ft-lbs	(555 N-m)
Static Roll Moment		1,830 ft-lbs	(2480 N-m)	2,750 ft-lbs	(3725 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	2,160 ft-lbs	(2925 N-m)	2,235 ft-lbs	(3030 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	580 ft-lbs	(785 N-m)	600 ft-lbs	(810 N-m)
Static Pitch & Yaw Moment		3,860 ft-lbs	(5230 N-m)	3,980 ft-lbs	(5395 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	1,945 lbs	(882 kgf)	1,945 lbs	(882 kgf)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	525 lbs	(238 kgf)	525 lbs	(238 kgf)
Each Bearing Static Load Capacity		2,910 lbs	(1320 kgf)	2,910 lbs	(1320 kgf)
Maximum Belt Tensile Force		350 lbs	(159 kg)	350 lbs	(159 kg)
Maximum Carriage Thrust Force		230 lbs	(104 kg)	230 lbs	(104 kg)
Maximum Speed		118 in/sec	(3 m/sec)	118 in/sec	(3 m/sec)
Maximum Acceleration		772 in/sec ²	(19,6 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	3.660 in	(92,96 mm)	3.660 in	(92,96 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail	9.290 in	(235,97 mm)	4.645 in	(117,98 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.320 in	(33,53 mm)	1.320 in	(33,53 mm)

Other	For Four (4) & Six (6) Bearing Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Belt Properties	Black, 32 mm wide, Polyurethane, Steel reinforced belt
Drive Pulley Weight	0.39 lbs (0,18 kg)
Drive Pulley Diameter	1.128 in (28,65 mm)
Drive Lead	3.543 in (90,00 mm)
Belt Stretch - x Load (lbs or N)	0.00011 in/ft per lbs (0,00212 mm/m per N)
Unidirectional Repeatability	+/- 0.001 in (+/- 0,0254 mm)
Bidirectional Repeatability	+/- 0.004 in (+/- 0,1016 mm)
Position Accuracy (Belt) ⁽¹⁾	< 0.010 in/ft (< 0,254 mm/300mm)
Orthogonality (multi-axis systems)	< 30 arc-seconds
Friction Coefficient	< 0.01
Breakaway Torque	< 75 oz-in (0,530 N-m)
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, and Gearheads
Coupling	Two (2) different styles available
Waycover Material	Hypilon Polyester Bellows mounted to carriage & end plates

Footnotes:

(1) Position accuracy varies based on belt stretch. The given rating is based upon a carriage speed of 5 inches/sec (127 mm/sec) and a no load condition.

Dimensions & Specifications

- Without Cover Plates -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
18x12006-CP0	6 (150)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	22.1 (10,0)
18x12012-CP0	12 (300)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	24.3 (11,0)
18x12018-CP0	18 (455)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	26.5 (12,0)
18x12024-CP0	24 (605)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	28.7 (13,0)
18x12030-CP0	30 (760)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	30.9 (14,0)
18x12036-CP0	36 (910)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	33.1 (15,0)
18x12042-CP0	42 (1060)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	35.3 (16,0)
18x12048-CP0	48 (1215)	60.125 (308,0)	66.250 (463,6)	19	40	3.8 (0,11)	37.5 (17,0)
18x12054-CP0	54 (1370)	66.125 (1679,6)	72.250 (1835,2)	21	44	15.8 (0,45)	39.7 (18,0)
18x12066-CP0	66 (1675)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	44.1 (20,0)
18x12078-CP0	78 (1980)	90.125 (2289,2)	96.250 (2444,8)	29	60	23.3 (0,66)	48.5 (22,0)
18x12090-CP0	90 (2285)	102.125 (2594,0)	108.250 (2749,6)	33	68	26.3 (0,75)	52.9 (24,0)
18x12102-CP0	102 (2590)	114.125 (2898,8)	120.250 (3054,4)	37	76	29.3 (0,83)	57.3 (26,0)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

- (1) Weight shown is with a 4 bearing carriage [5.0 lbs (2,26 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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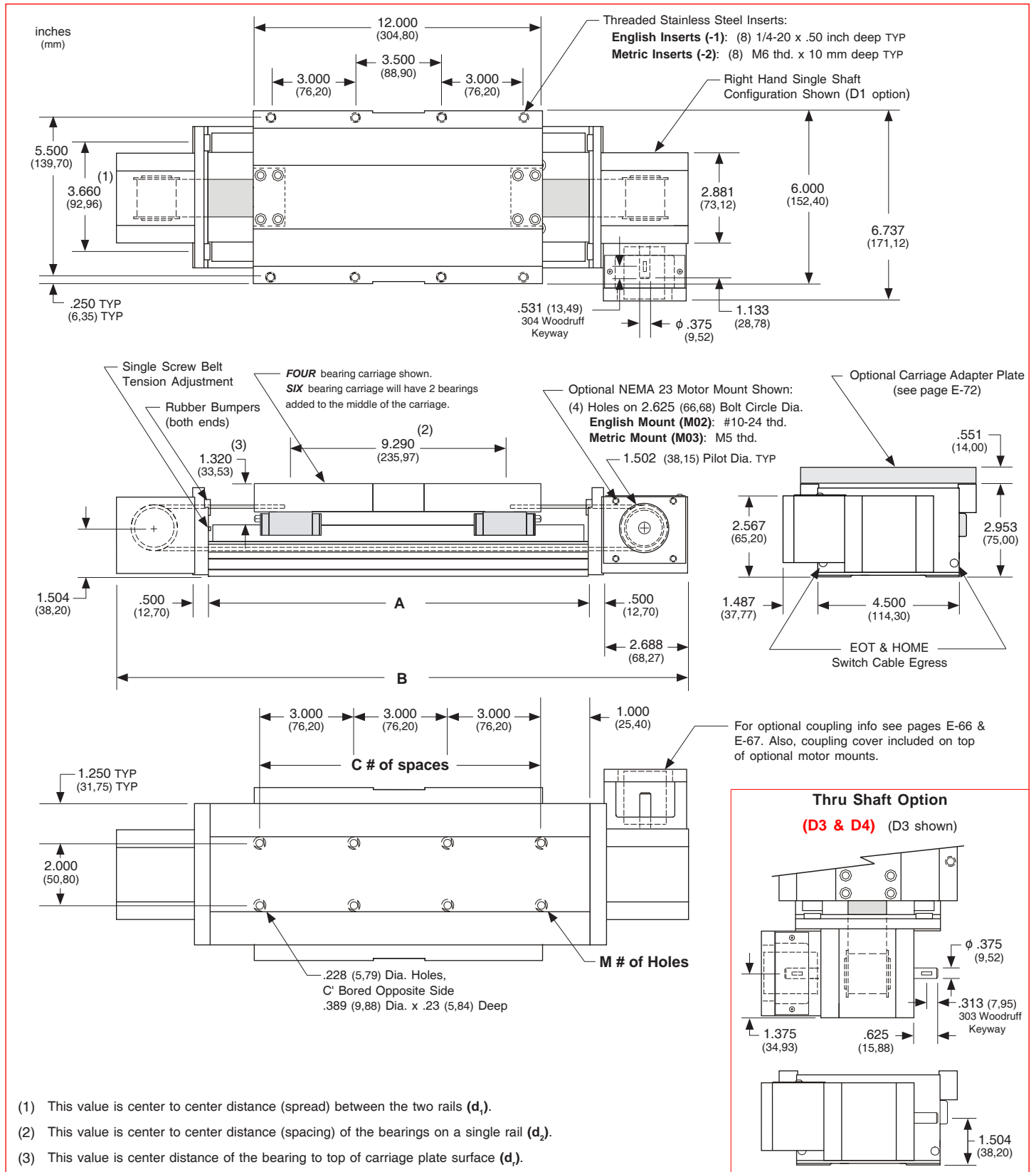
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Specifications Subject to Change Without Notice

Dimensions

- Without Cover Plates -



- (1) This value is center to center distance (spread) between the two rails (d_1).
- (2) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (3) This value is center distance of the bearing to top of carriage plate surface (d_3).

Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top Cover Plate Only -

Model Number	Travel Length ⁽¹⁾ inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table Weight ⁽²⁾ lbs (kg)
		A	B	C	M		
18x12006-CP1	6 (150)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	23.3 (10,6)
18x12012-CP1	12 (300)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	25.9 (11,7)
18x12018-CP1	18 (455)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	28.5 (12,9)
18x12024-CP1	24 (605)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	31.1 (14,1)
18x12030-CP1	30 (760)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	33.7 (15,3)
18x12036-CP1	36 (910)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	36.3 (16,5)
18x12042-CP1	42 (1060)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	38.9 (17,6)
18x12048-CP1	48 (1215)	60.125 (308,0)	66.250 (463,6)	19	40	3.8 (0,11)	41.5 (18,8)
18x12054-CP1	54 (1370)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	44.1 (20,0)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

- (1) For travels greater than 54 inches (1520 mm) a top cover plate (-CP1) cannot be used due to the sag of the cover plate.
- (2) Weight shown is with a 4 bearing carriage [5.0 lbs (2,26 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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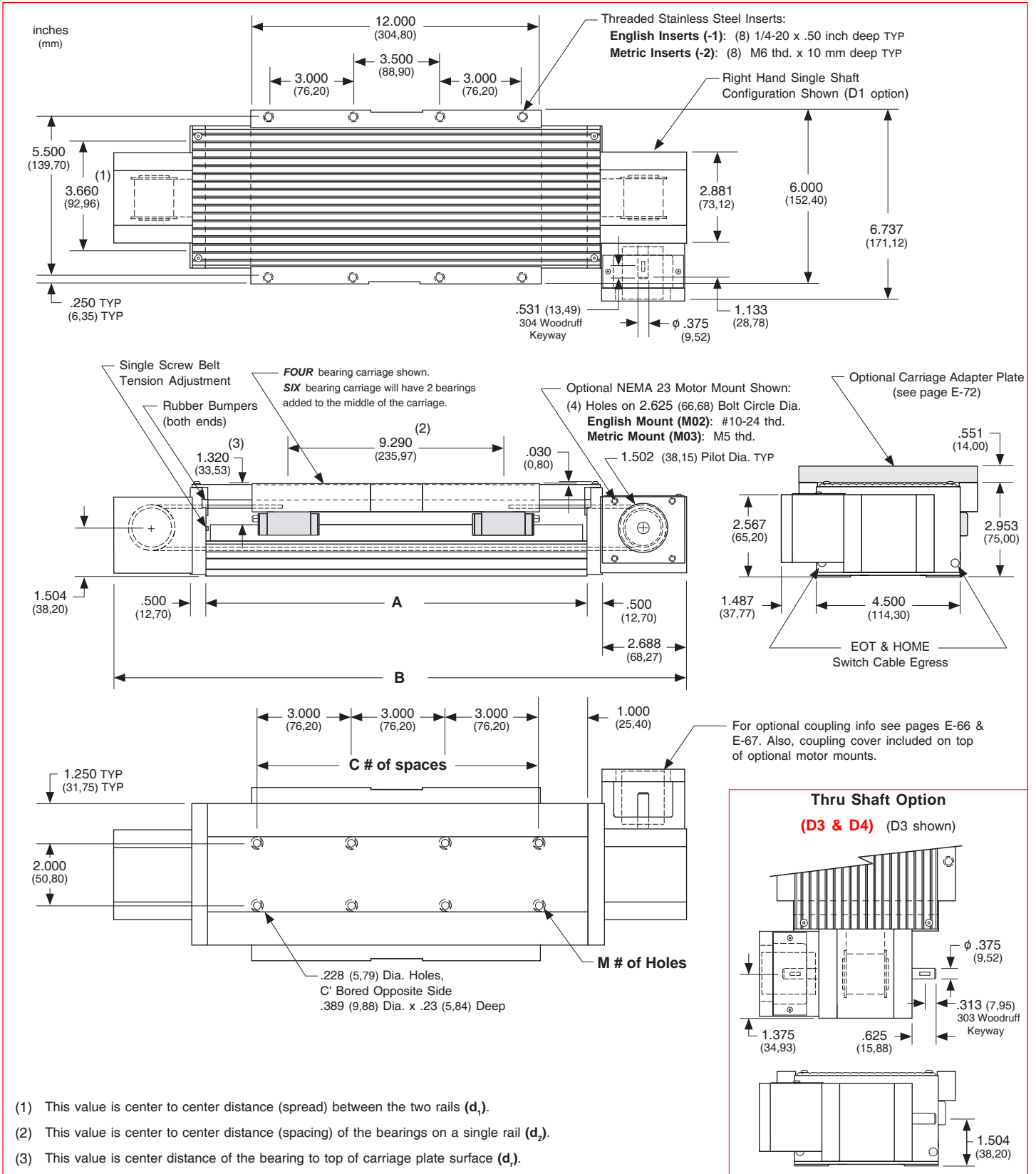
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Dimensions

- With Top Cover Plate Only -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Top & Side Cover Plates -

Model Number	Travel Length ⁽¹⁾ inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table Weight ⁽²⁾ lbs (kg)
		A	B	C	M		
18x12006-CP2	6 (150)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	25.2 (11,4)
18x12012-CP2	12 (300)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	28.2 (12,8)
18x12018-CP2	18 (455)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	31.2 (14,2)
18x12024-CP2	24 (605)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	34.1 (15,5)
18x12030-CP2	30 (760)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	37.1 (16,8)
18x12036-CP2	36 (910)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	40.1 (18,2)
18x12042-CP2	42 (1060)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	43.0 (19,5)
18x12048-CP2	48 (1215)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	46.0 (20,9)
18x12054-CP2	54 (1370)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	48.9 (22,2)
18x12066-CP2⁽¹⁾	66 (1675)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	49.7 (22,5)
18x12078-CP2⁽¹⁾	78 (1980)	90.125 (2289,2)	96.250 (2444,8)	29	60	23.3 (0,66)	54.9 (24,9)
18x12090-CP2⁽¹⁾	90 (2285)	102.125 (2594,0)	108.250 (2749,6)	33	68	26.3 (0,75)	60.1 (27,3)
18x12102-CP2⁽¹⁾	102 (2590)	114.125 (2898,8)	120.250 (3054,4)	37	76	29.3 (0,83)	65.3 (29,6)

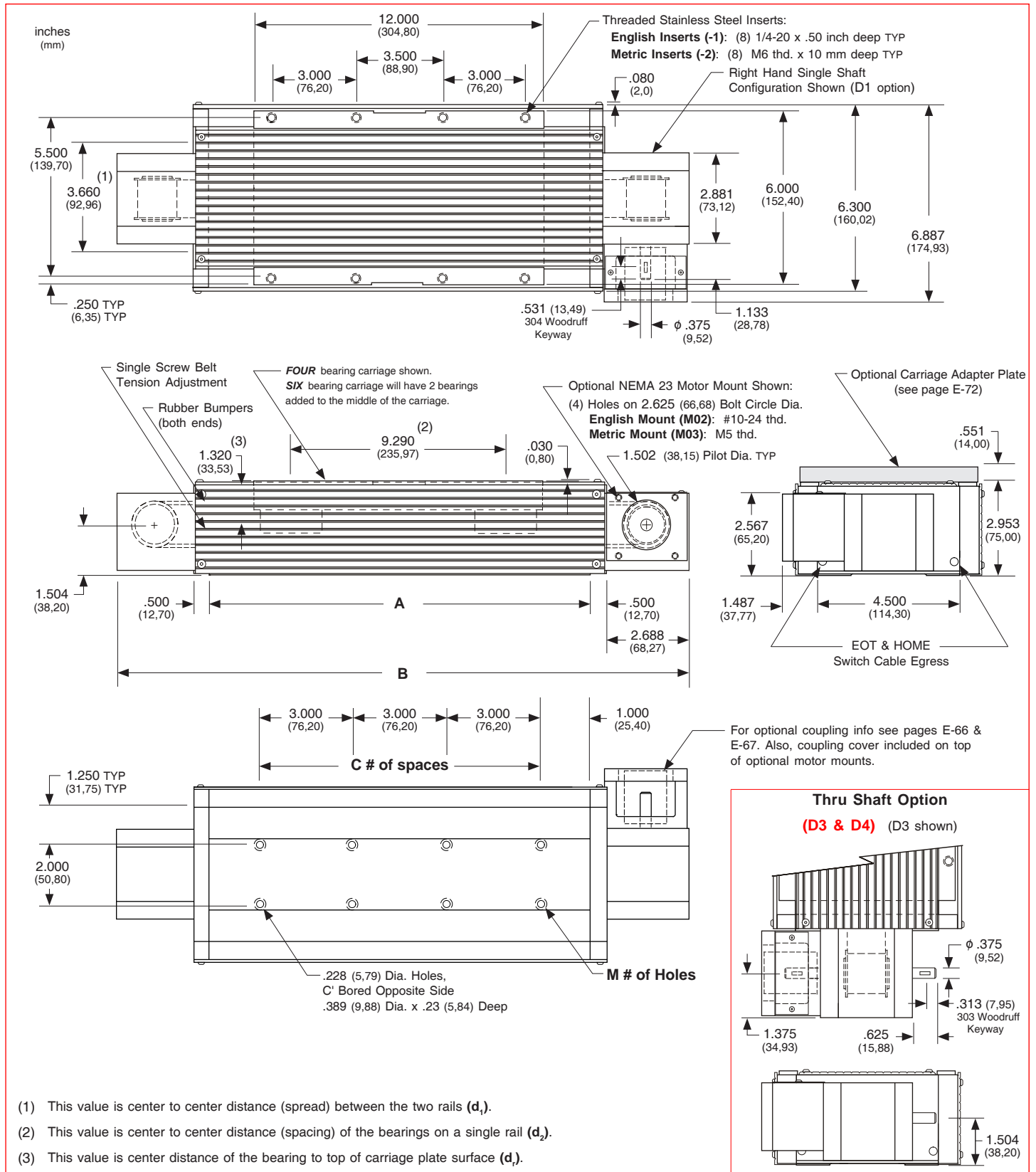
- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

- (1) For travels greater than 60 inches (1520 mm) the top cover plate cannot be used due to the sag of the cover plate. Just the two side cover plates are installed.
- (2) Weight shown is with a 4 bearing carriage [5.0 lbs (2,26 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

Dimensions

- With Top & Side Cover Plates -



Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)		Belt Weight ounces (kg)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	M		
18x12003-WC1	3.7 (90)	12.125 (308,0)	18.250 (463,6)	3	8	3.8 (0,11)	22.9 (10,4)
18x12008-WC1	8.0 (203)	18.125 (460,4)	24.250 (616,0)	5	12	5.3 (0,15)	25.3 (11,5)
18x12012-WC1	12.8 (325)	24.125 (612,8)	30.250 (768,4)	7	16	6.8 (0,19)	27.8 (12,6)
18x12017-WC1	17.5 (444)	30.125 (765,2)	36.250 (920,8)	9	20	8.3 (0,23)	30.0 (13,6)
18x12022-WC1	22.0 (555)	36.125 (917,6)	42.250 (1073,2)	11	24	9.8 (0,28)	32.4 (14,7)
18x12028-WC1	28.0 (710)	42.125 (1070,0)	48.250 (1225,6)	13	28	11.3 (0,32)	34.8 (15,8)
18x12032-WC1	32.5 (825)	48.125 (1222,4)	54.250 (1378,0)	15	32	12.8 (0,36)	37.2 (16,9)
18x12037-WC1	37.0 (935)	54.125 (1374,8)	60.250 (1530,4)	17	36	14.3 (0,41)	39.7 (18,0)
18x12041-WC1	41.5 (1050)	66.125 (1679,6)	72.250 (1835,2)	21	44	17.3 (0,49)	42.3 (19,2)
18x12053-WC1	53.5 (1355)	78.125 (1984,4)	84.250 (2140,0)	25	52	20.3 (0,58)	47.5 (21,5)

- x = 4; Carriage has 4 bearings; Carriage weight = 5.0 lbs. (2,27 kg)
- x = 6; Carriage has 6 bearings; Carriage weight = 5.8 lbs. (2,63 kg)

Footnotes:

- (1) Weight shown is with a 4 bearing carriage [5.0 lbs (2,26 kg)], a NEMA 23 motor mount [0.39 lbs (0,18 kg)], and a H100 style [0.08 lbs (0,04 kg)] coupling. When using a 6 bearing carriage add 0.8 lbs (0,36 kg) to each value.

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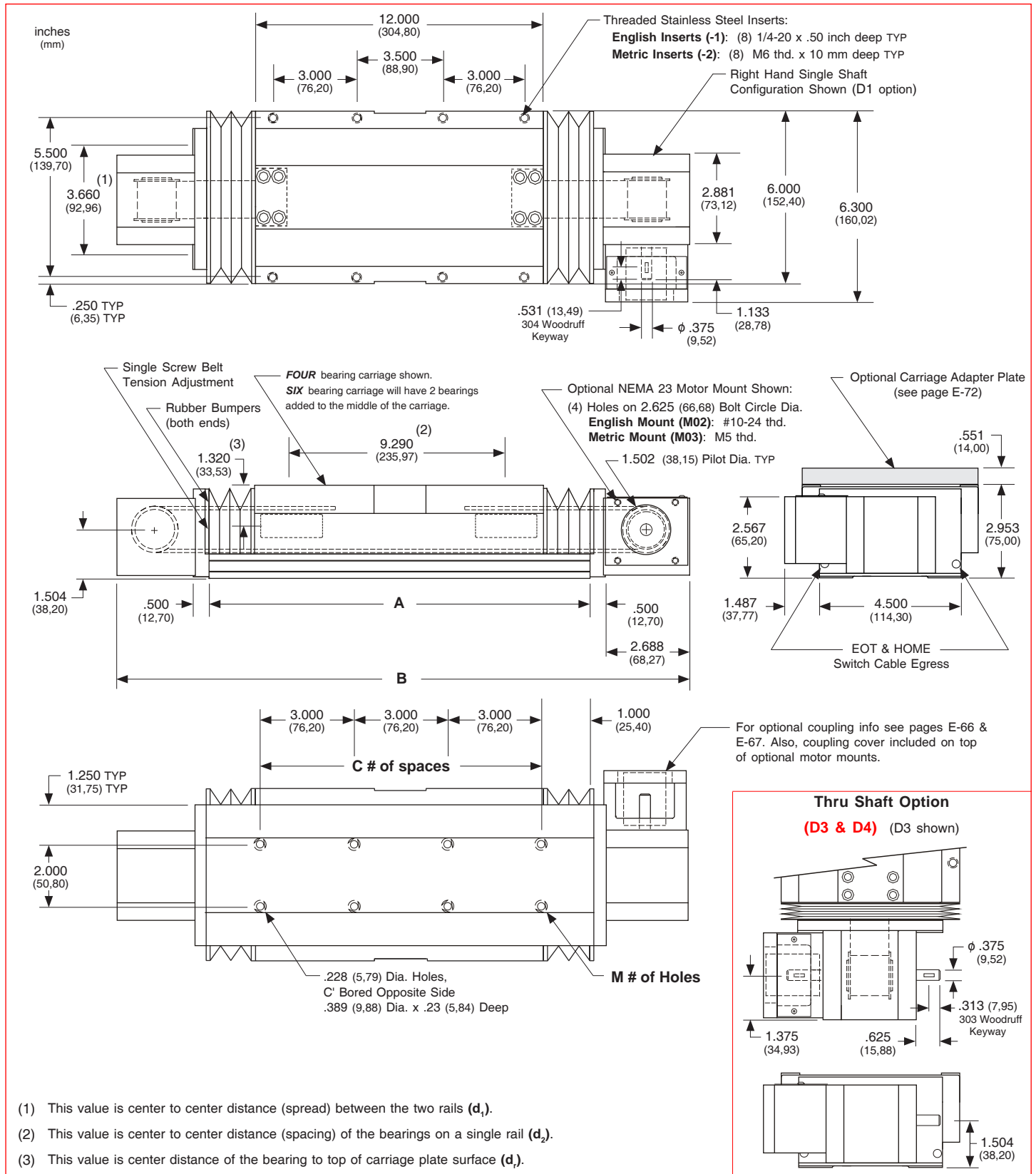
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Specifications Subject to Change Without Notice

Dimensions

- With Waycovers -



- (1) This value is center to center distance (spread) between the two rails (d_1).
- (2) This value is center to center distance (spacing) of the bearings on a single rail (d_2).
- (3) This value is center distance of the bearing to top of carriage plate surface (d_3).

Note: Any 160, 170, or 180 series table can be mounted on top of a second 160, 170 or 180 series table, in order to create X-Y multiple axis configurations. See page E-72 for optional carriage adapter plate information or contact *LINTECH* for details.

Maximum Motor Input Torque, Maximum Belt Force, & Maximum Acceleration Rate

Maximum Motor Input Torque

The maximum safe speed/torque of a motor/drive system that can be used with the 180 series, is limited by the belt strength at a given speed. The maximum linear forces the belt can adequately handle are determined by the number of teeth on the pulley and the belt width. The chart below illustrates the relationship between motor input torque/belt force and carriage speed. Care should be taken when sizing and selecting a motor/drive system for use with a 180 series table. Exceeding the maximum input torque values at the listed speeds can cause belt "skipping" over pulley teeth. This will result in mis-positioning of the carriage.

Maximum Acceleration

The maximum acceleration rate using a 180 series table can be determined by the simple equation $F = M \times A$. Knowing the mass of the load, and the maximum safe operating force for the belt, the maximum possible acceleration rate can be determined. **Note:** The mechanical limitation for acceleration of the 180 series table is 2 g's.

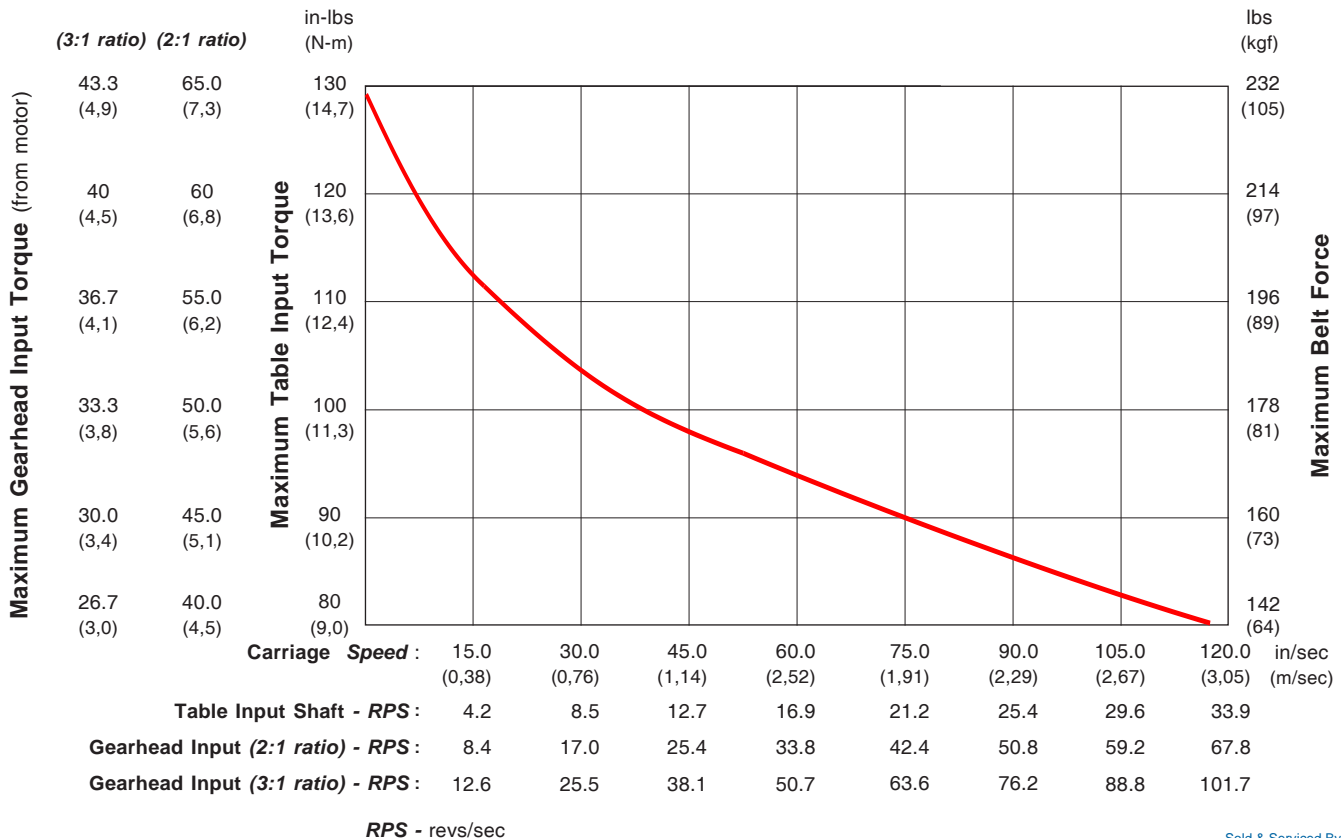
Maximum Acceleration Example

- F** = **M** x **A**
- F** = maximum belt force at desired speed (lbs)
- M** = user applied load (lbs)
- A** = maximum acceleration rate (g's)
- Sin ϕ** = angle of table from horizontal (degrees)

<i>Horizontal Application</i>	<i>Vertical Application</i>
$A = \frac{F}{M}$	$A = \frac{F - M \sin \phi}{M}$

Example: A 80 lb load is mounted to a 180 series carriage in a horizontal application. Determine the maximum accel rate in g's & in/sec² that can be used to achieve a maximum speed of 75 IPS.

- Step 1:** From graph below, determine the maximum belt force at 75 IPS : (**F = 160 lbs**).
- Step 2:** Add up your total mass = load weight + carriage weight : (**M = 80 + 4 = 84 lbs**).
- Step 3:** Solve for A : (**A = 160/84 = 1.9 g's**).
- Note:** 1 g = 386 in/sec²
- Step 5:** 1.9 g's x 386 = 733 in/sec².



- 1) Table friction & breakaway forces have already been deducted from the above maximum belt force values.
- 2) Curve based upon maximum belt values. Select a motor coupling that can handle the required torque.

Master/Slave 180 Series Configuration

For some X-Y belt drive applications, the master/slave configuration shown to the right may be required. This system provides two bottom (X) axes spread apart a set distance, yet driven by one motor. The spreading of the two bottom axes minimizes the deflection on the Y axis, reduces the moment loading on the X axes carriages, increases the system rigidity, and prevents twisting of the Y axis as it accelerates to a set speed. *LINTECH* can provide the shaft supports, the cross shaft, the couplings, and the 180 series belt drive table without a motor mount bracket. The shaft supports are required as the couplings DO NOT provide adequate support of the shaft by themselves. Also, the shaft supports prevent the cross shaft from "whipping" at long lengths and high speeds.

The chart below lists the maximum carriage speed available with a given distance between shaft supports. A minimum of two shaft supports is always required. More than two can be used to increase the speed of a longer spread system. The equations below show the relationship between the # of shaft supports, the spread between the two bottom axes (B), and the distance between individual shaft supports (A).

A = distance between shaft supports

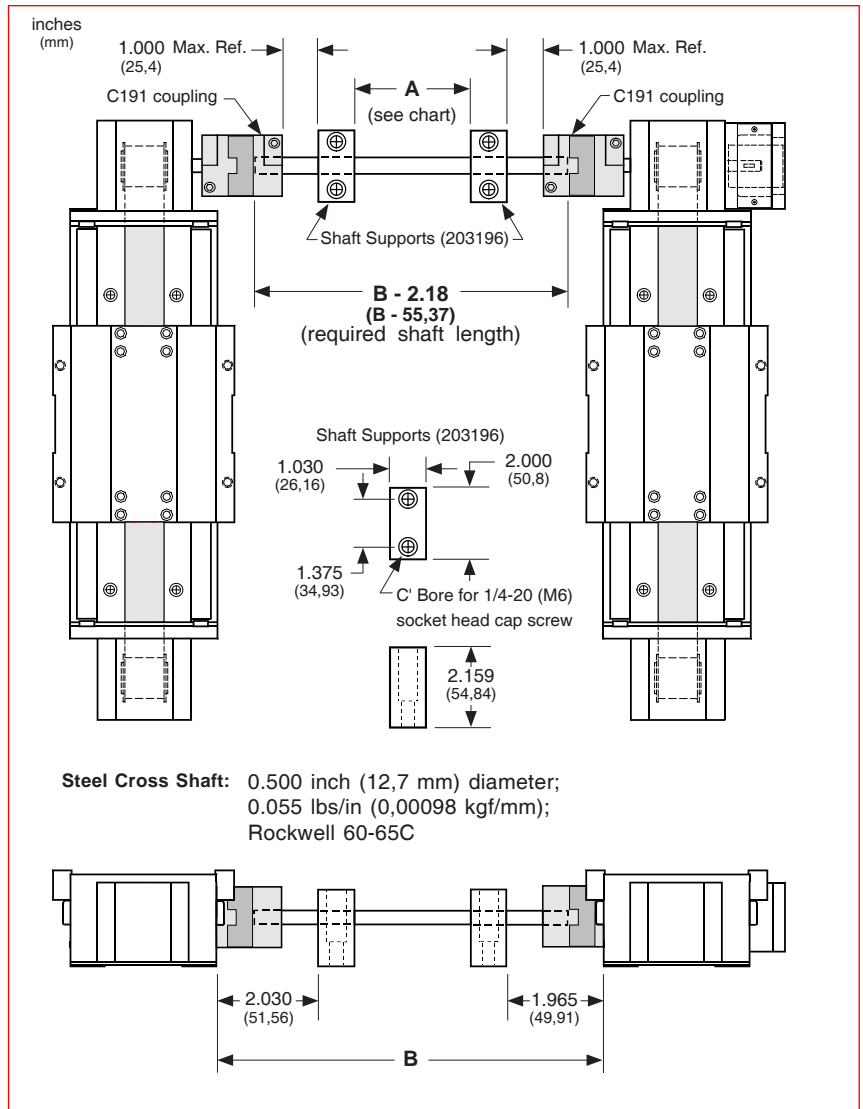
B = distance between 2 bottom axes

2 Shaft Supports: $A = [B - 7.50 \text{ in (190,5 mm)}]$

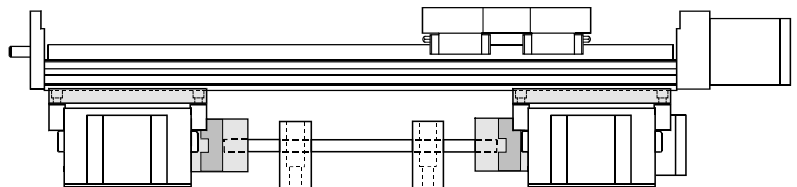
3 Shaft Supports: $A = [B - 8.53 \text{ in (216,7 mm)}] / 2$

4 Shaft Supports: $A = [B - 9.56 \text{ in (242,8 mm)}] / 3$

Maximum Distance Between Shaft Supports A		Maximum Shaft Speed (RPM)	Equivalent Carriage Speed	
(inches)	(mm)		(in/sec)	(mm/sec)
<= 30	762	2000	118	3000
<= 36	914	1500	89	2250
<= 48	1219	840	50	1260
<= 54	1372	660	39	990
<= 60	1524	535	32	802
<= 66	1676	440	26	660
<= 72	1829	370	22	555
<= 84	2134	270	16	405
<= 96	2438	208	12	312
<= 108	2743	164	10	246
<= 120	3048	133	8	200



Example:



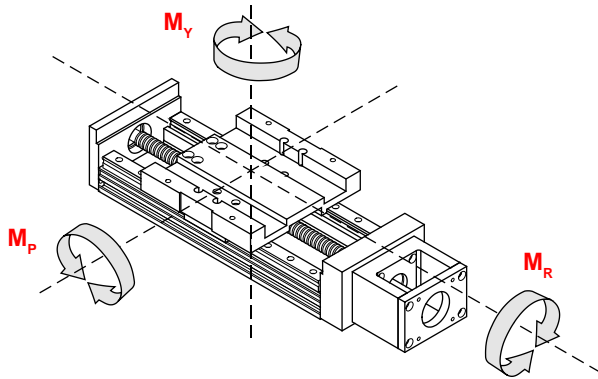
Note: The user is required to supply the mounting surface for the above configurations. *LINTECH* normally only supplies all the positioning hardware. A common base plate can be provided by *LINTECH* upon request.

Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 160, 170 or 180 series 6 inch carriage positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

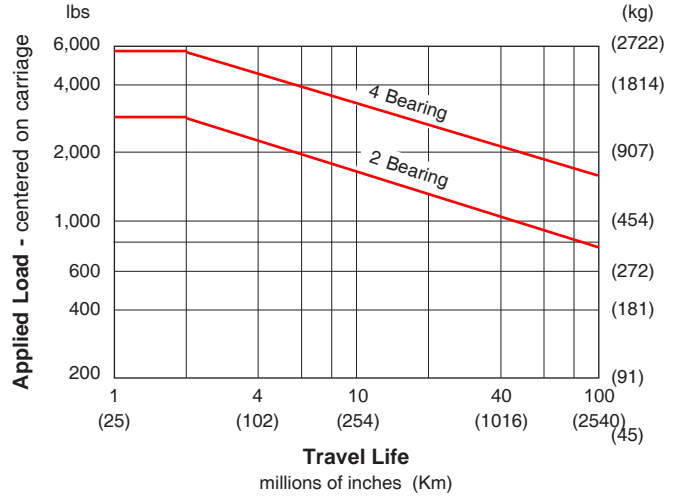
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	3,890	(1765)	7,780	(3530)
50	(1270)	1,325	(601)	2,650	(1202)
100	(2540)	1,045	(474)	2,090	(948)

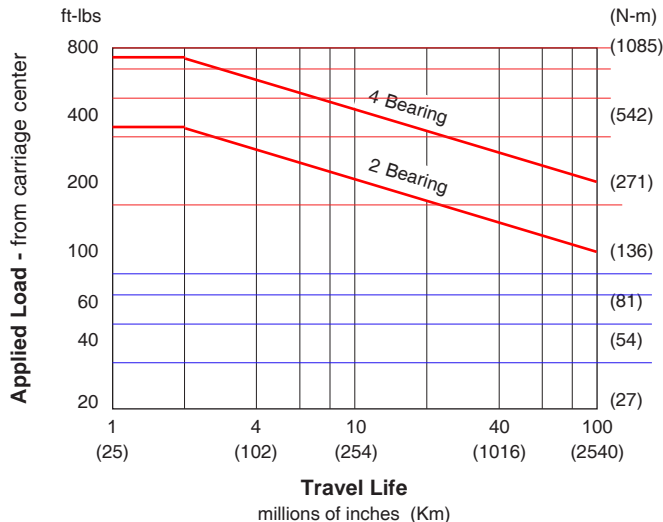


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	510	(690)	1,025	(1390)
50	(1270)	174	(235)	349	(473)
100	(2540)	137	(185)	275	(370)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

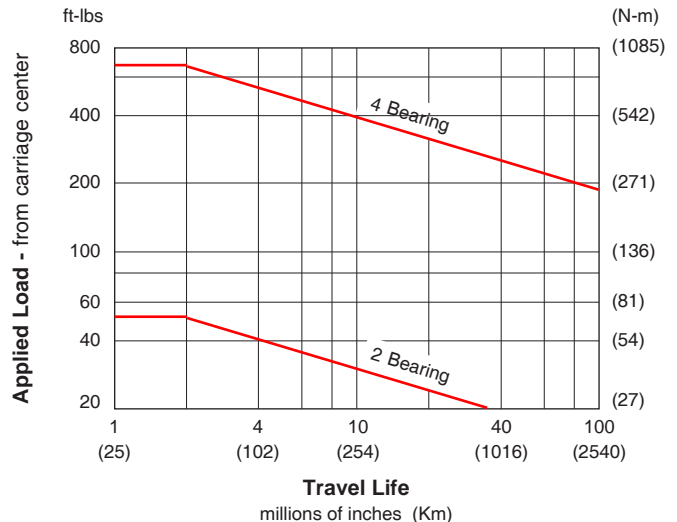


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	71	(96)	930	(1260)
50	(1270)	24	(33)	315	(427)
100	(2540)	19	(26)	275	(370)

Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)

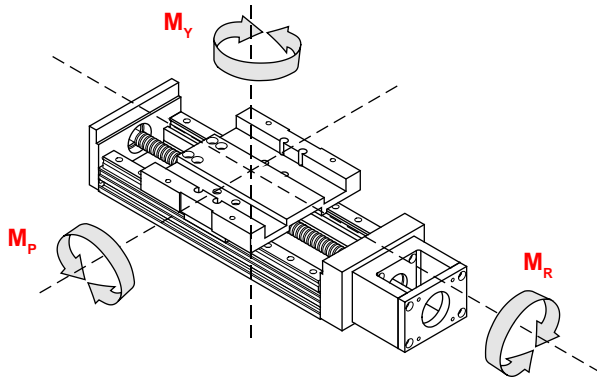


Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 170 or 180 series 12 inch carriage positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

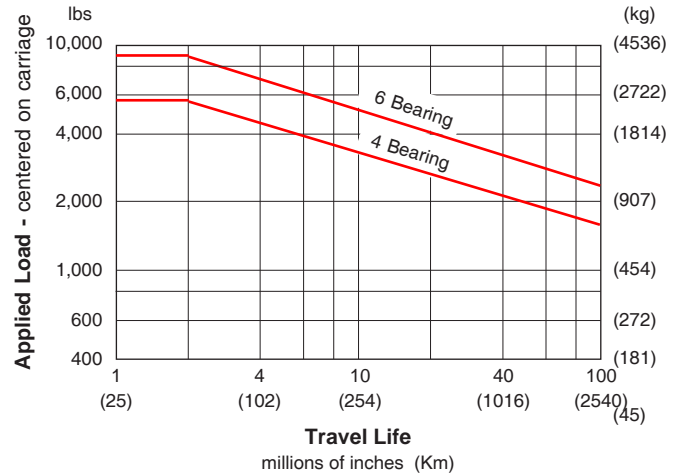
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		4 Bearing		6 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	5,600	(2540)	8,400	(3810)
50	(1270)	1,910	(866)	2,870	(1301)
100	(2540)	1,515	(687)	2,280	(1034)

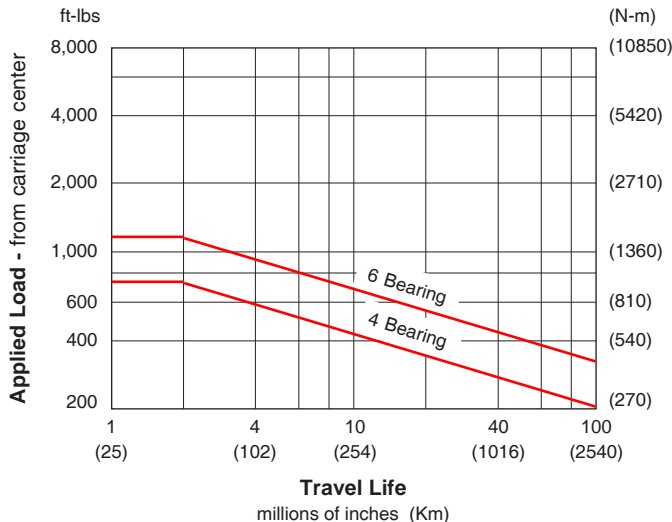


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		4 Bearing		6 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	740	(1003)	1,110	(1504)
50	(1270)	252	(342)	380	(515)
100	(2540)	200	(271)	300	(406)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

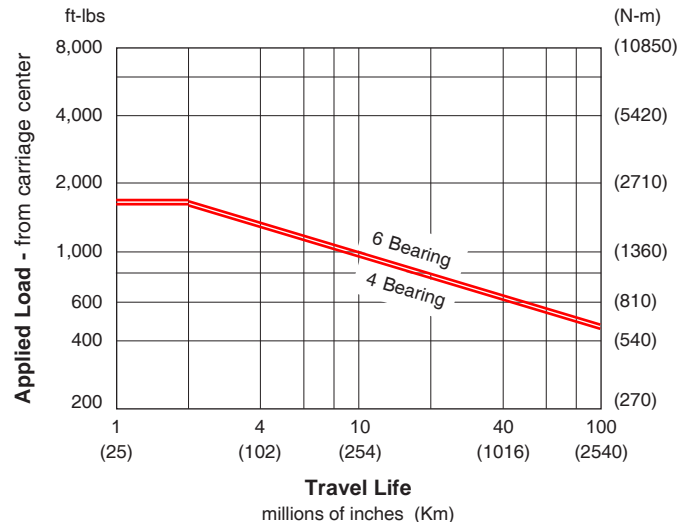


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		4 Bearing		6 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	1,560	(2115)	1,611	(2646)
50	(1270)	533	(722)	550	(904)
100	(2540)	422	(572)	435	(589)

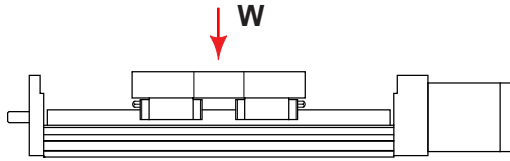
Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)



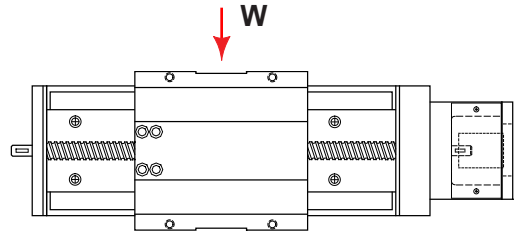
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$$I = 0.23 \text{ in}^4 \text{ (} 0.96 \times 10^5 \text{ mm}^4\text{)}$$



$$I = 4.85 \text{ in}^4 \text{ (} 20.2 \times 10^5 \text{ mm}^4\text{)}$$



End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 160, 170 or 180 series table, each switch is mounted to the side of the table, while the actuating cams are mounted to the carriage assembly. The *T-slot* which runs along both sides of the 160, 170 and 180 series, allows the switches to be located anywhere along the table. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

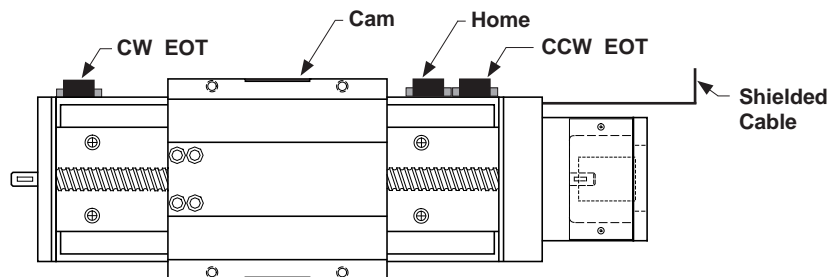
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located between the EOT switches, near the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 160, 170, & 180 series (non way-cover versions), EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #. For the 170-WC1 & 180-WC1 series, there is NO reduction of listed travel length when using EOT switches.

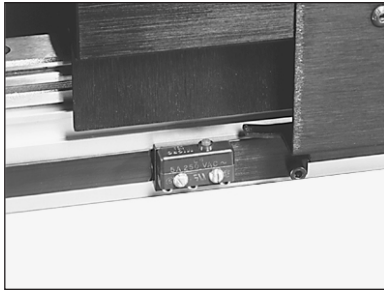
Note: Each switch can be located anywhere along the T-slots, which run on both sides of the table.

Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

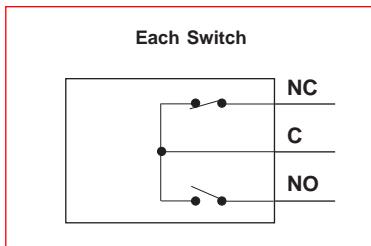
Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

End of Travel (EOT) Switches & Home Switch

Mechanical Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 amps @ 125 VAC
1 amp @ 85 VDC
- Activation Style : mechanical cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 85° C
- Environment : non wash down
- Added Table Width : 0.063 inch (1,6 mm) (EOT switches)
0.063 inch (1,6 mm) (Home switch)
- Individual Switch Wiring : none



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

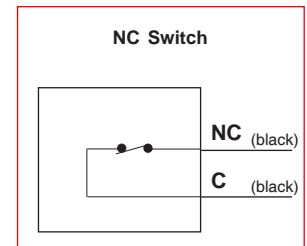
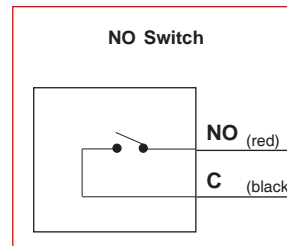
Wire Color	Description
Black	CW EOT NC
Blue	CW Common
Red	CCW EOT NC
White	CCW Common
Brown	HOME NO
Green	HOME Common
Silver	Shield

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches



- Repeatability : +/- 0.0020 inch (50 microns)
- Electrical : 1.0 amps @ 125 VAC
0.5 amps @ 100 VDC
- Activation Style : magnetic
- Activation Area : 0.30 inches (7,62 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : non wash down
- Added Table Width : 0.063 inch (1,6 mm) (EOT switches)
0.063 inch (1,6 mm) (Home switch)
- Individual Switch Wiring : 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description
Black	CW EOT (black) NC
Blue	CW Common (black)
Red	CCW EOT (black) NC
White	CCW Common (black)
Brown	HOME (red) NO
Green	HOME Common (black)
Silver	Shield

- CW - Clockwise
- CCW - Counter Clockwise
- EOT - End of Travel
- NC - Normally Closed
- NO - Normally Open

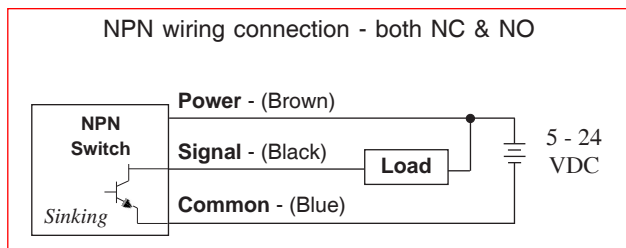
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 Toll Free Fax (877) SERV099
www.electromate.com
sales@electromate.com

End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Added Table Width : 0.063 inch (1,6 mm) (EOT switches)
0.063 inch (1,6 mm) (Home switch)
- Individual Switch Wiring : 12 inch (305 mm) leads



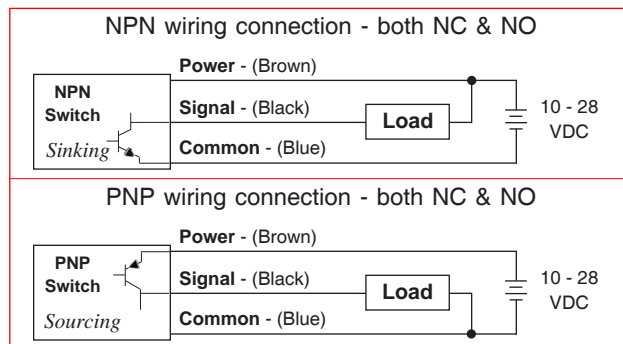
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is ordered with any table)
10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 10 - 28 VDC
15 mA - power input
100 mA max - signal
- Actuation Style : non-magnetic cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 75° C
- Environment : IEC IP67 wash down
- Added Table Width : 0.20 inch (5,1 mm) (EOT switches)
0.20 inch (5,1 mm) (Home switch)
- Individual Switch Wiring : 6.5 foot (2 m) cable for NPN
3.3 foot (1 m) cable for PNP

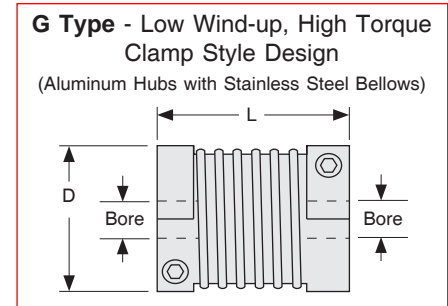
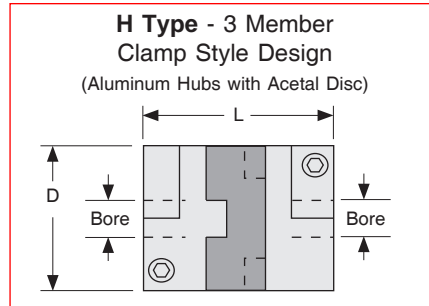
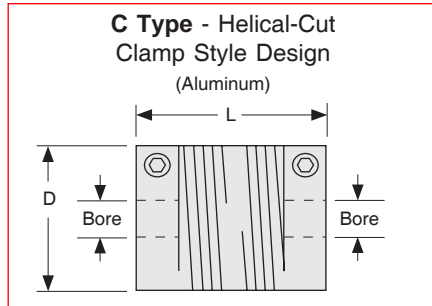


Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is ordered with any table)
10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw (or belt) drive shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model Number (1)	D inches (mm)	L inches (mm)	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
			Table	Motor	Minimum (in) (mm)	Maximum (in) (mm)				
C100-375-aaa	1.00 (25,4)	1.50 (38,1)	375	aaa	.250 6	.375 10	1.5 (43)	.19 (35)	23.0 (0,9)	400 (2,8)
C125-375-aaa (1)	1.25 (31,8)	2.00 (50,8)	375	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)
H100-375-aaa	1.00 (25,4)	1.28 (32,5)	375	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)
H131-375-aaa (1)	1.31 (33,3)	1.89 (48,0)	375	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)
H163-375-aaa (2)	1.63 (41,4)	2.00 (50,8)	375	aaa	.375 10	.750 20	5.4 (153)	1.79 (328)	1.2 (0,047)	2,000 (14,1)
G100-375-aaa	0.99 (25,2)	1.26 (32,0)	375	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)
G126-375-aaa	1.26 (32,1)	1.62 (41,0)	375	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)
G158-375-aaa (2)	1.58 (40,2)	1.85 (47,0)	375	aaa	.375 10	.750 20	4.3 (120)	1.34 (245)	0.2 (0,008)	2,400 (17,0)
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch		750 = .750 inch		005 = 5 mm 006 = 6 mm 008 = 8 mm 009 = 9 mm	010 = 10 mm 011 = 11 mm 012 = 12 mm 014 = 14 mm	016 = 16 mm 018 = 18 mm 019 = 19 mm 020 = 20 mm			

Footnotes:

- (1) This coupling option can not be used with the optional NEMA 23 motor mount for the 160 & 170 series because its length is too long. However, this coupling option can be used with the optional NEMA 34 motor mount. Custom motor mounts can be provided upon request. See page E-67 for more details.
- (2) This coupling option can not be used with the optional NEMA 23 motor mount for the 180 series because its diameter is too big. However, this coupling option can be used with the optional NEMA 34 motor mount.. Custom motor mounts can be provided upon request. See page E-67 for more details.

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sales@electromate.com

Specifications Subject to Change Without Notice

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

Specification	160 & 170 Series	160 & 170 Series	180 Series	180 Series
	NEMA 23 bracket	NEMA 34 bracket	NEMA 23 bracket	NEMA 34 bracket
	inches (mm)	inches (mm)	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.375 (9,53)	0.375 (9,53)	0.375 (9,53)	0.375 (9,53)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)	1.500 (38,10)	2.000 (50,80)
Maximum coupling length	1.750 (44,45)	2.250 (57,15)	1.900 (48,26)	2.375 (60,32)
Note: Custom brackets available upon request.				

Coupling Part Numbers

C025 C100-375-250
C026 C100-375-375
C027 C100-375-006
C028 C100-375-008
C030 C100-375-009
C029 C100-375-010

C048 C125-375-250
C049 C125-375-375
C050 C125-375-500
C051 C125-375-006
C052 C125-375-008
C053 C125-375-010
C054 C125-375-012
C055 C125-375-014
C069 C125-375-016

C130 H100-375-250
C131 H100-375-375
C132 H100-375-006
C133 H100-375-008
C135 H100-375-009
C134 H100-375-010
C136 H100-375-011

C155 H131-375-250
C156 H131-375-375
C157 H131-375-500
C158 H131-375-625
C159 H131-375-006
C160 H131-375-008
C183 H131-375-009
C161 H131-375-010
C184 H131-375-011
C162 H131-375-012
C163 H131-375-014
C164 H131-375-016

C190 H163-375-375
C191 H163-375-500
C192 H163-375-625
C193 H163-375-750
C194 H163-375-010
C195 H163-375-012
C196 H163-375-014
C197 H163-375-016
C198 H163-375-018
C199 H163-375-019
C200 H163-375-020

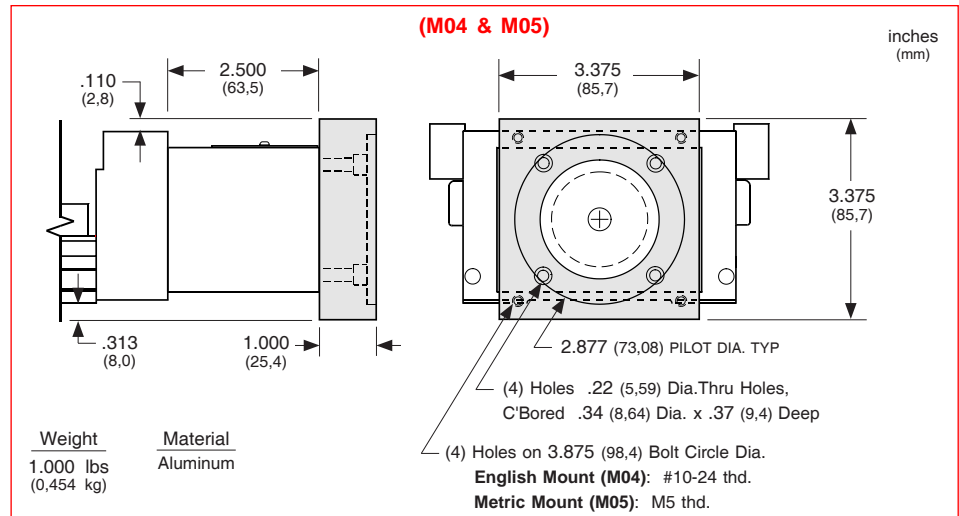
C407 G100-375-250
C408 G100-375-375
C409 G100-375-500
C410 G100-375-006
C411 G100-375-008
C414 G100-375-009
C412 G100-375-010
C415 G100-375-011
C413 G100-375-012

C435 G126-375-250
C436 G126-375-375
C437 G126-375-500
C438 G126-375-625
C439 G126-375-006
C440 G126-375-008
C463 G126-375-009
C441 G126-375-010
C464 G126-375-011
C442 G126-375-012
C443 G126-375-014
C444 G126-375-016

C470 G158-375-375
C471 G158-375-500
C472 G158-375-625
C473 G158-375-750
C474 G158-375-010
C514 G158-375-011
C475 G158-375-012
C476 G158-375-014
C477 G158-375-016
C478 G158-375-018
C479 G158-375-019
C480 G158-375-020

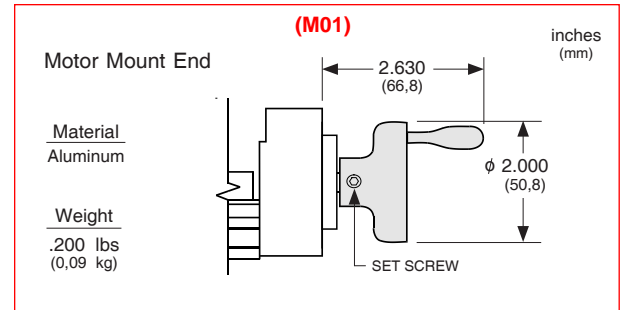
NEMA 34 Motor Mount

A NEMA 34 aluminum motor adapter bracket can be mounted to the 160, or 170, series positioning tables. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



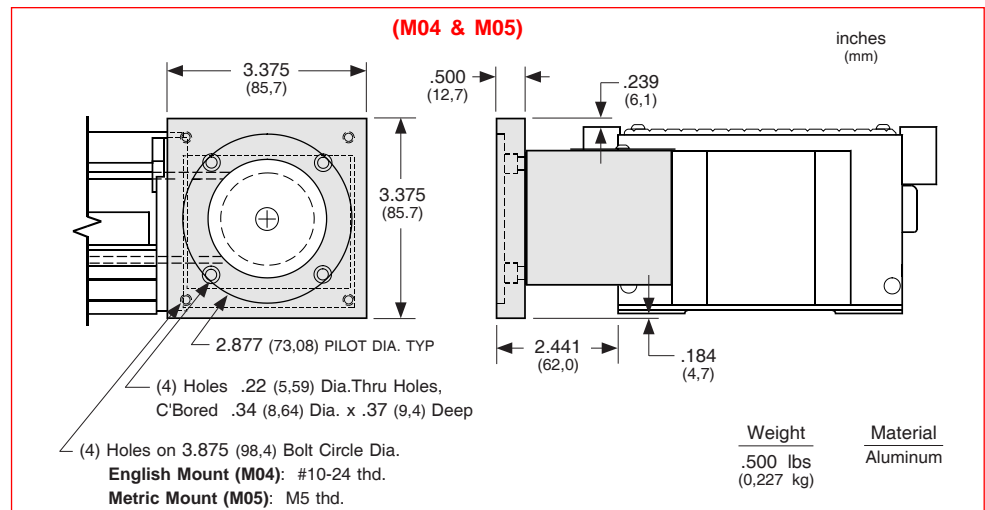
Hand Crank

For manually operated applications, *LINTECH* provides a hand crank option for the 160, 170, or 180 table series. The hand crank replaces the motor mount and coupling on the table.



NEMA 34 Motor Mount for 180 Series

The 180 series positioning table can be provided with an optional NEMA 34 motor adapter bracket. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.

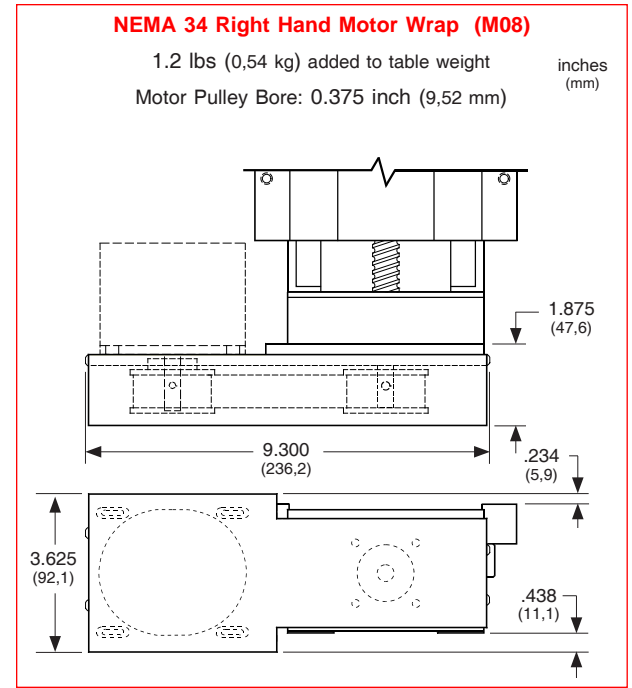
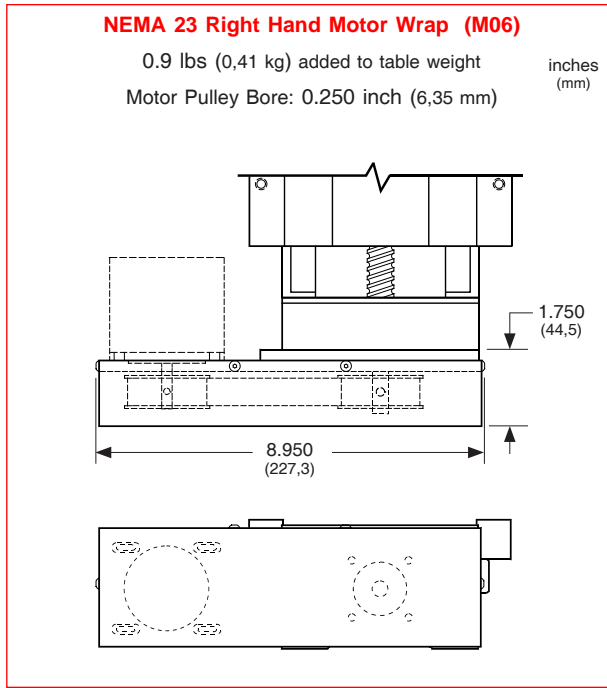


Other Motor Mounts

LINTECH can provide motor adapter brackets for any step motor, or servo motor, that has mounting requirements other than what are shown in this catalog. Please review our Website for the latest information on some standard motor mounts that are readily available.

Motor Wrap Packages for 160 & 170 Series

For space limited 160 & 170 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 23	1.65 (41,9)	7.5 (0,21)	1.65 (41,9)	7.5 (0,21)	1.0 (0,028)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)

Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores **MUST** be specified for non-NEMA motors.

Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 160 or 170 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. The 180 series will have the brake mounted to the thru drive shaft option. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

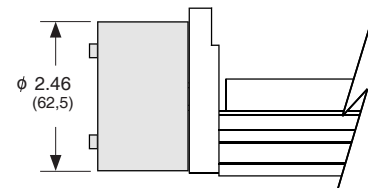
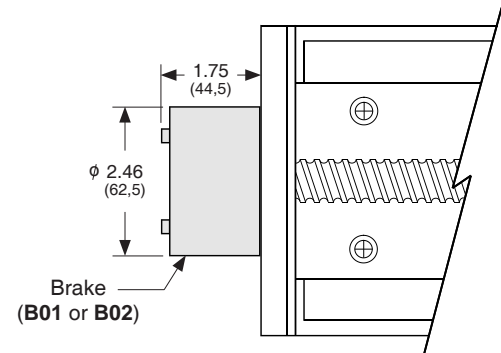
Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60

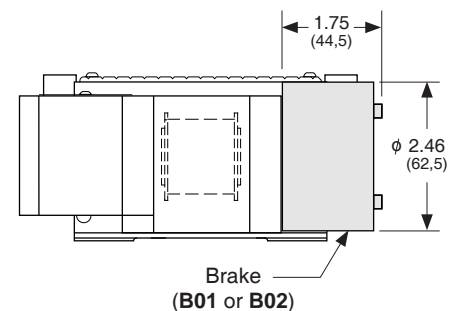
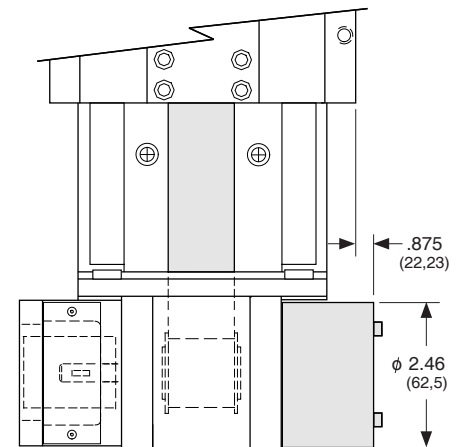
160 or 170 Series

Table end opposite
motor mount bracket

inches
(mm)



180 Series



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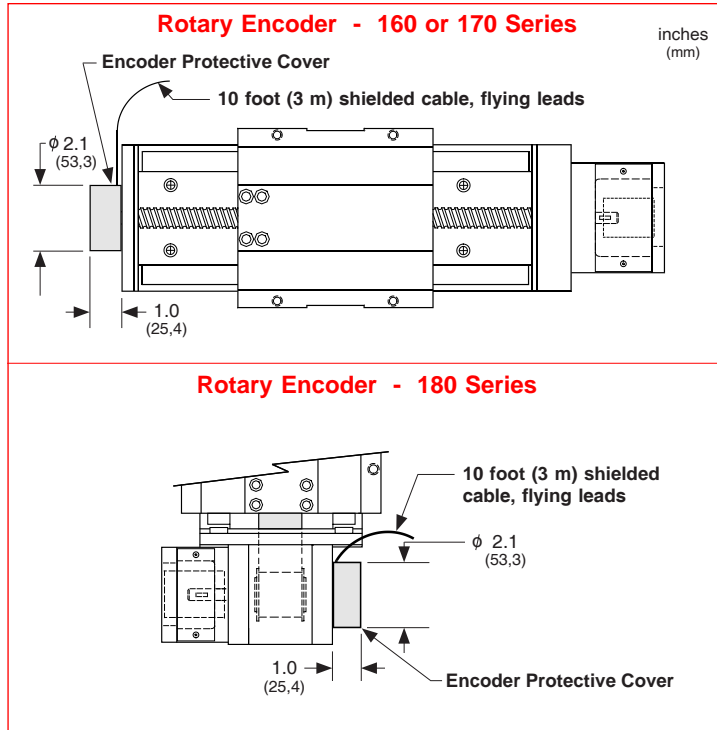
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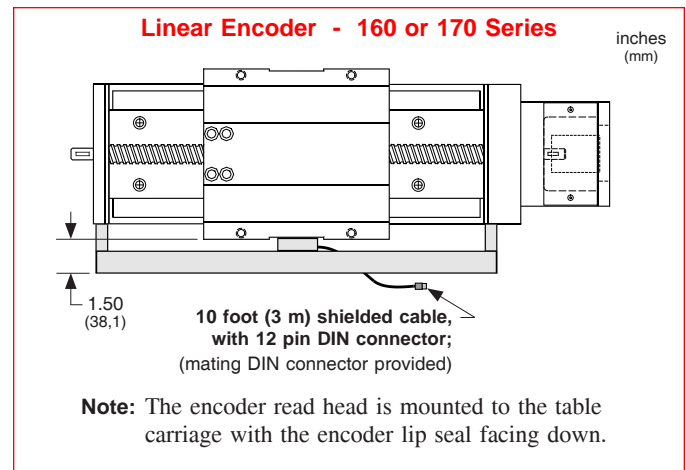
Specifications Subject to Change Without Notice

Linear & Rotary Incremental Encoders

Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 160 or 170 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 160, 170 or 180 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.



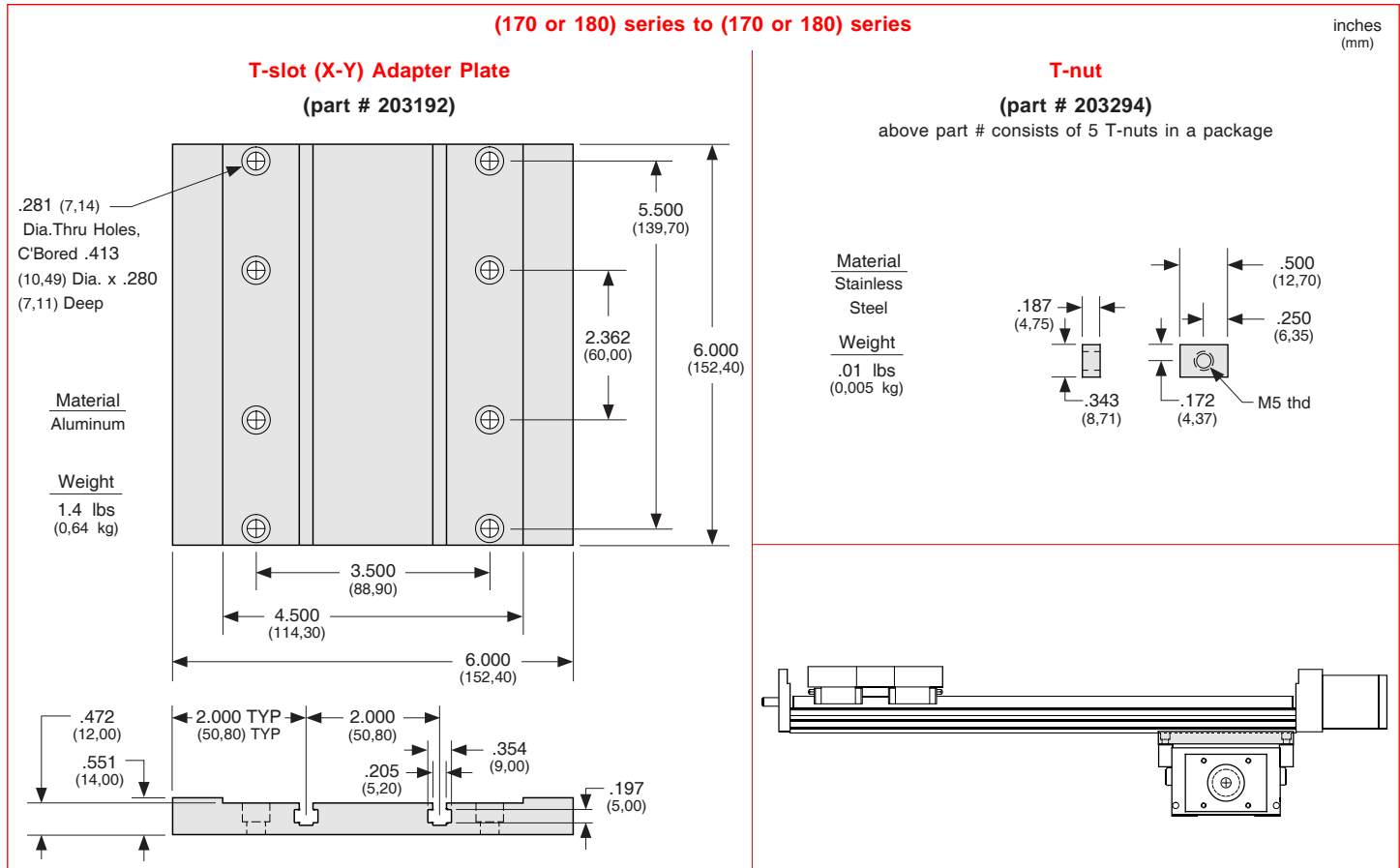
LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32 ^o F to 140 ^o F (0 ^o C to 60 ^o C)			32 ^o F to 120 ^o F (0 ^o C to 50 ^o C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

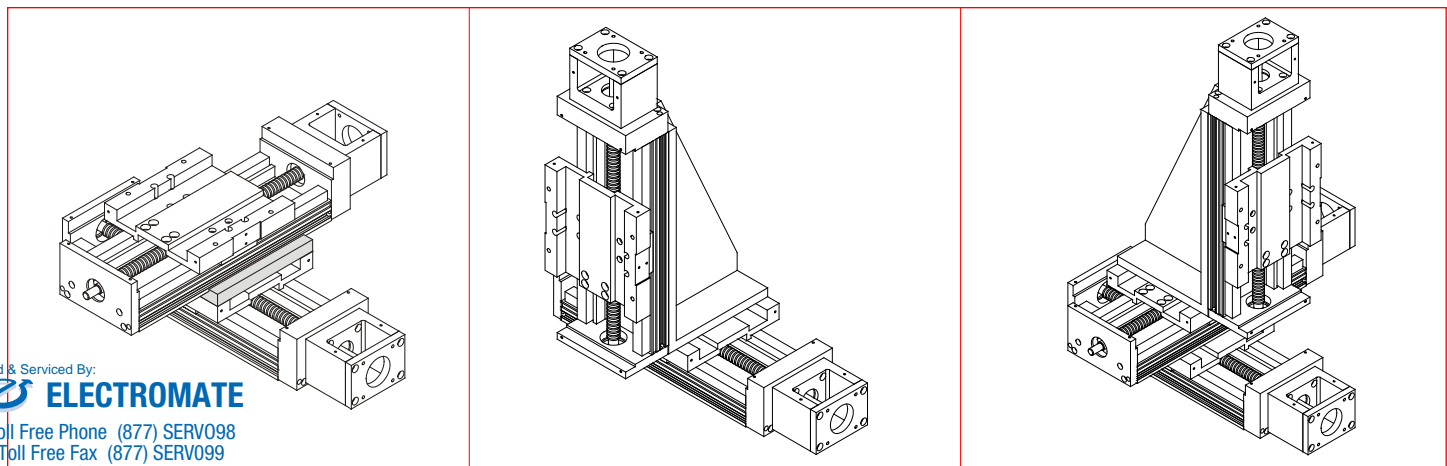
Carriage Adapter Plate

An optional carriage adapter plate assists in the creation of a simple X-Y multiple axis system for use with the 170 & 180 series. This adapter plate is mounted first to the carriage of the bottom (X) axis. Then the top (Y) axis sits in the channel of the adapter plate. The Y axis base can then be mounted to the adapter plate using the T-nuts. This adapter plate helps maintain an orthogonality between the two tables of < 30 arc-seconds.



Multi-Axis Configurations

LINTECH can provide adapter plates and vertical brackets, to facilitate the construction of X-Y, X-Z, and X-Y-Z multi-axis configurations. There are hundreds of possible configurations available. See below for some of the more common systems. *LINTECH* has experience dealing with multiple axis configurations. Sometimes different standard table series can be mounted to form a custom system. Other times, a custom assembly can be created. Contact *LINTECH* for more information.



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150 Series Positioning Tables



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Single or Multiple Axis

LINTECH's 150 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 150 series tables are designed with a low friction, preloaded, recirculating linear ball bearing system, which rides on a precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 40 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 150 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Vertical Angle Brackets

Optional vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Waycovers

For operator protection, these tables can be fitted with a protective bellows. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 150 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 150 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

Other

The 150 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

Standard Features - 150 Series

- ❑ Compact 6.750 inches (171 mm) wide by 2.625 inches (67 mm) tall
- ❑ Travel lengths from 6 inches (150 mm) to 62 inches (1570 mm)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ 0° F to +185° F (-18° C to +85° C) operating temperature
- ❑ 2 rail, 2 & 4 bearing, 4 & 8 inch long carriages
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design

150-WC0 Series



150-WC1 Series



Options - 150 Series

- ❑ Chrome plated linear bearings, rails and screws
- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via the internet
- ❑ Adapter brackets for non-NEMA motors
- ❑ Linear and rotary incremental encoders
- ❑ NEMA 23 & 34 motor wrap packages
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Vertical angle bracket
- ❑ Turcite nut option
- ❑ Motor couplings
- ❑ Hand crank

- ❑ Ball screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 0.625 inch diameter, 1.000 inch lead
- 0.750 inch diameter, 0.200 inch lead
- 0.750 inch diameter, 0.500 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 10 mm lead
- 16 mm diameter, 16 mm lead
- 0.750 inch diameter, 0.200 inch lead
- 20 mm diameter, 5 mm lead
- 20 mm diameter, 20 mm lead

Ground - Preloaded Nuts Only:

- 0.625 inch diameter, 0.200 inch lead
- 16 mm diameter, 5 mm lead
- 16 mm diameter, 16 mm lead
- 0.750 inch diameter, 0.200 inch lead
- 0.750 inch diameter, 0.500 inch lead

- ❑ Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.625 inch diameter, 0.100 inch lead
- 0.625 inch diameter, 0.200 inch lead

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15 08 06 - WC1 - 1 - S114 - M02 - C155 - L01 - E00 - B00

Table Series

Carriage Length

04 - 4 inches **08** - 8 inches

Travel Length (see pages G-6 & G-8)

06 - 6 to 62 inches

Waycovers

WC0 - with no waycovers **WC1** - with waycovers

Carriage Inserts (see pages G-7 & G-9)

1 - English mount **2** - Metric mount

Screw Options (see pages G-18 to G-23)

Rolled ball screws

- S005** - .625 x .200 NPL
- S006** - .625 x .200 PL
- S007** - .625 x .200 NPL(T)
- S008** - .625 x .200 PL(T)
- S009** - .625 x 1.000 NPL
- S010** - .625 x 1.000 PL
- S011** - .625 x 1.000 NPL(T)
- S012** - .625 x 1.000 PL(T)
- S013** - .750 x .200 NPL
- S014** - .750 x .200 PL
- S015** - .750 x .200 NPL(T)
- S016** - .750 x .200 PL(T)
- S017** - .750 x .500 NPL
- S018** - .750 x .500 PL
- S019** - .750 x .500 NPL(T)
- S020** - .750 x .500 PL(T)

Precision ball screws

- S114** - .625 x .200 NPL
- S115** - .625 x .200 PL
- S116** - 16 x 5 NPL
- S117** - 16 x 5 PL
- S118** - 16 x 10 NPL
- S119** - 16 x 10 PL
- S120** - 16 x 16 NPL
- S121** - 16 x 16 PL
- S122** - .750 x .200 NPL
- S123** - .750 x .200 PL
- S124** - 20 x 5 NPL
- S125** - 20 x 5 PL
- S128** - 20 x 20 NPL
- S129** - 20 x 20 PL

Ground ball screws

- S212** - .625 x .200 PL
- S213** - .625 x .500 PL
- S214** - 16 x 5 PL
- S215** - 16 x 16 PL
- S216** - .750 x .200 PL
- S217** - .750 x .500 PL

Rolled acme screws

- S300** - .625 x .100 NPL
- S301** - .625 x .100 PL
- S302** - .625 x .200 NPL
- S303** - .625 x .200 PL
- S999** - other

Motor Mount (see pages G-7 & G-9, G-26 to G-27)

- M00** - none
- M02** - NEMA 23 mount (E)
- M06** - NEMA 23 (RH) wrap
- M01** - hand crank
- M03** - NEMA 23 mount (M)
- M07** - NEMA 23 (LH) wrap
- M04** - NEMA 34 mount (E)
- M08** - NEMA 34 (RH) wrap
- M09** - other
- M05** - NEMA 34 mount (M)
- M09** - NEMA 34 (LH) wrap

Coupling Options (see pages G-24 to G-25)

- C000** - none
- C025 to C029** - C100
- C130 to C134** - H100
- C407 to C413** - G100
- C999** - other
- C048 to C055** - C125
- C155 to C164** - H131
- C435 to C444** - G126

Limit & Home Switches (see pages G-15 to G-17)

- | | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|------------|
| L00 - no switches | | Mechanical | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L01 | L04 | L07 | L10 | L13 |
| | EOT switches only | L02 | L05 | L08 | L11 | L14 |
| | home switch only | L03 | L06 | L09 | L12 | L15 |

Encoder Options (see page G-29)

- E00** - none
- E02** - rotary (1000 lines/rev)
- E10** - linear (2500 lines/inch)
- E99** - other
- E01** - rotary (500 lines/rev)
- E03** - rotary (1270 lines/rev)
- E11** - linear (125 lines/mm)

Power-off Brakes (see page G-28)

- B00** - none
- B01** - 24 VDC
- B02** - 90 VDC
- B99** - other



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Specifications Subject to Change Without Notice

- (E) - English Interface
- (NPL) - Non Preloaded
- (LH) - Left Hand
- (PL) - Preloaded
- (M) - Metric Interface
- (RH) - Right Hand
- (T) - Turcite Nut

Specifications

Load Capacities		4 inch (2 bearing) Carriage		8 inch (4 bearing) Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	1,900 lbs	(862 kg)	3,800 lbs	(1724 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	645 lbs	(293 kg)	1,290 lbs	(585 kg)
Static Horizontal		3,400 lbs	(1542 kg)	6,800 lbs	(3084 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	285 ft-lbs	(386 N-m)	575 ft-lbs	(780 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	98 ft-lbs	(133 N-m)	196 ft-lbs	(266 N-m)
Static Roll Moment		515 ft-lbs	(698 N-m)	1,030 ft-lbs	(1396 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	56 ft-lbs	(76 N-m)	700 ft-lbs	(949 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	19 ft-lbs	(26 N-m)	239 ft-lbs	(324 N-m)
Static Pitch & Yaw Moment		100 ft-lbs	(136 N-m)	1,255 ft-lbs	(1702 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	950 lbs	(431 kg)	950 lbs	(431 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	323 lbs	(147 kg)	323 lbs	(147 kg)
Each Bearing Static Load Capacity		1,700 lbs	(771 kg)	1,700 lbs	(771 kg)
Thrust Force Capacity	10 million screw revolutions	895 lbs	(406 kg)	895 lbs	(406 kg)
Thrust Force Capacity	500 million screw revolutions	240 lbs	(109 kg)	240 lbs	(109 kg)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	4.300 in	(109,2 mm)	4.300 in	(109,2 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	4.900 in	(124,5 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.250 in	(31,8 mm)	1.250 in	(31,8 mm)

Other	For 4 inch (2 bearing) & 8 inch (4 bearing) Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages G-18 to G-23)	Acme Screw - Stainless Steel
Screw Material (see pages G-18 to G-23)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00004 in/in (< 1,02 microns/25mm)
Flatness	< 0.00004 in/in (< 1,02 microns/25mm)
Orthogonality (multi-axis systems)	< 15 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows firmly mounted to carriage & end plates

Dimensions & Specifications

- Without Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	M		
150408-WC0	8 (200)	13.62 (345,9)	16.12 (409,4)	1.190 (30,2)	3	8	15.28 (388)	21.9 (9,9)
150416-WC0	16 (400)	21.25 (539,7)	23.75 (603,2)	1.250 (31,7)	5	12	22.91 (582)	28.4 (12,9)
150423-WC0	23 (580)	28.75 (730,2)	31.25 (793,7)	1.250 (31,7)	7	16	30.41 (772)	33.9 (15,4)
150431-WC0	31 (785)	36.50 (927,1)	39.00 (990,6)	1.380 (35,1)	9	20	38.16 (969)	40.3 (18,3)
150439-WC0	39 (990)	44.25 (1123,9)	46.25 (1174,7)	1.500 (38,1)	11	24	45.91 (1166)	46.8 (21,2)
150446-WC0	46 (1165)	51.75 (1314,4)	54.25 (1377,9)	1.500 (38,1)	13	28	53.41 (1357)	53.3 (24,2)
150462-WC0	62 (1570)	67.25 (1708,1)	69.75 (1771,6)	1.750 (44,4)	17	36	68.91 (1750)	66.2 (30,0)
150808-WC0	8 (200)	17.62 (447,5)	20.12 (511,0)	3.190 (81,0)	3	8	19.28 (490)	24.9 (11,3)
150816-WC0	16 (400)	25.25 (641,3)	27.75 (704,8)	3.250 (82,5)	5	12	26.91 (684)	31.4 (15,0)
150823-WC0	23 (580)	32.75 (831,8)	35.25 (895,3)	3.250 (82,5)	7	16	34.41 (874)	37.9 (17,2)
150831-WC0	31 (785)	40.50 (1028,7)	43.00 (1092,2)	3.380 (85,8)	9	20	42.16 (1071)	44.3 (20,1)
150839-WC0	39 (990)	48.25 (1225,5)	50.75 (1289,0)	3.500 (88,9)	11	24	49.91 (1268)	50.8 (23,1)
150846-WC0	46 (1165)	55.75 (1416,0)	58.25 (1479,5)	1.625 (41,1)	14	30	57.41 (1458)	57.3 (26,0)
150862-WC0	62 (1570)	71.25 (1809,7)	73.75 (1873,2)	1.875 (47,6)	18	38	72.91 (1852)	70.2 (31,8)

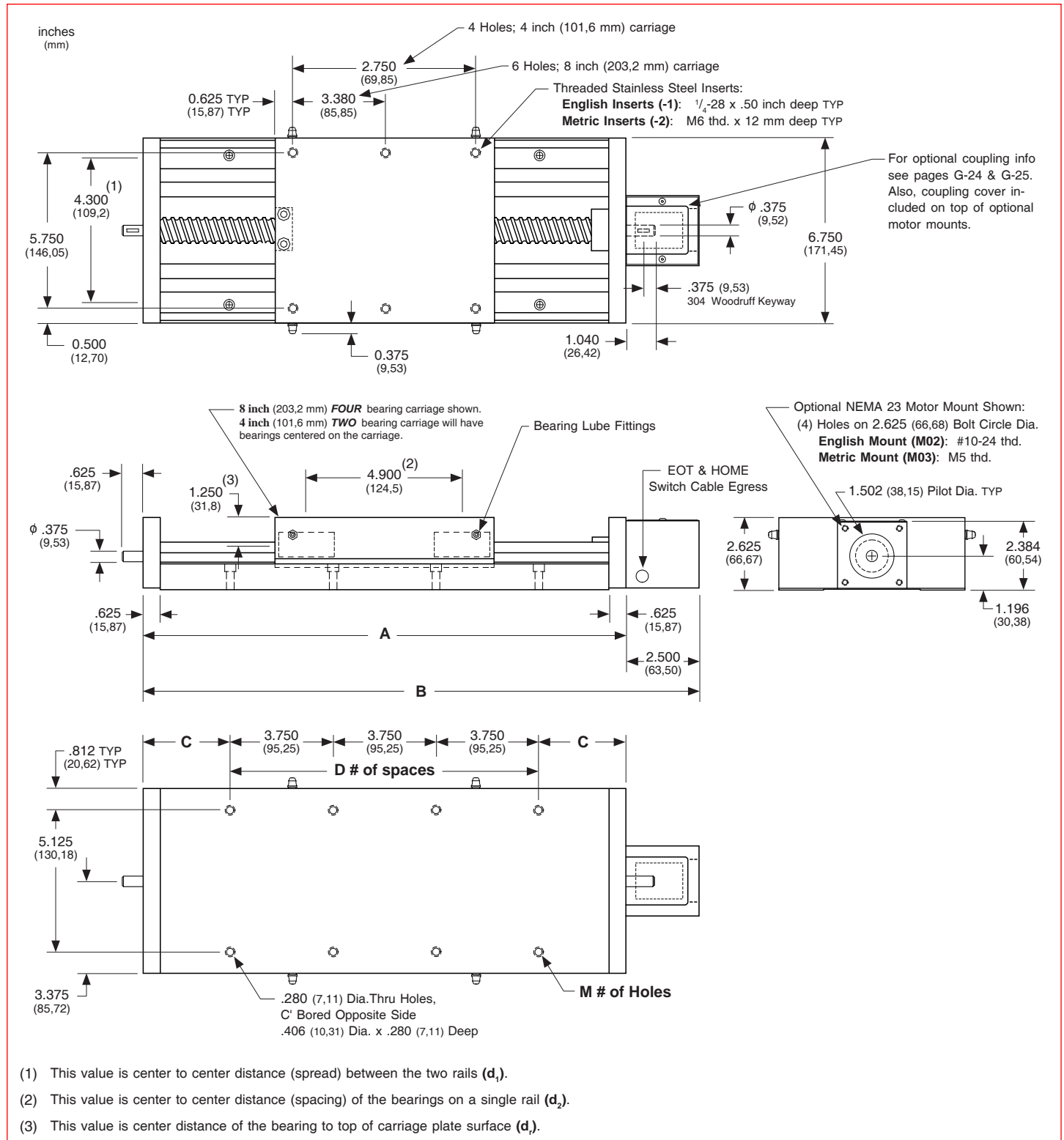
- 04 = 4 inch (101,6 mm) carriage length; 2 bearings; carriage weight = 4.0 lbs. (1,81 kg)
- 08 = 8 inch (203,2 mm) carriage length; 4 bearings; carriage weight = 7.0 lbs. (3,17 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number.

Dimensions

- Without Waycovers -



Note: Any 150 series table can be mounted on top of any second 150 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Contact **LINTECH**.

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Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	M		
150406-WC1	6 (150)	13.62 (345,9)	16.12 (409,4)	1.190 (30,2)	3	8	15.28 (388)	23.0 (10,4)
150412-WC1	12 (300)	21.25 (539,7)	23.75 (603,2)	1.250 (31,7)	5	12	22.91 (582)	30.0 (13,6)
150418-WC1	18 (455)	28.75 (730,2)	31.25 (793,7)	1.250 (31,7)	7	16	30.41 (772)	36.0 (16,3)
150424-WC1	24 (605)	36.50 (927,1)	39.00 (990,6)	1.380 (35,1)	9	20	38.16 (969)	43.0 (19,5)
150430-WC1	30 (760)	44.25 (1123,9)	46.25 (1174,7)	1.500 (38,1)	11	24	45.91 (1166)	50.0 (22,7)
150436-WC1	36 (910)	51.75 (1314,4)	54.25 (1377,9)	1.500 (38,1)	13	28	53.41 (1357)	57.0 (25,8)
150448-WC1	48 (1215)	67.25 (1708,1)	69.75 (1771,6)	1.750 (44,4)	17	36	68.91 (1750)	71.0 (32,2)
150806-WC1	6 (150)	17.62 (447,5)	20.12 (511,0)	3.190 (81,0)	3	8	19.28 (490)	26.0 (11,8)
150812-WC1	12 (300)	25.25 (641,3)	27.75 (704,8)	3.250 (82,5)	5	12	26.91 (684)	33.0 (15,0)
150818-WC1	18 (455)	32.75 (831,8)	35.25 (895,3)	3.250 (82,5)	7	16	34.41 (874)	40.0 (18,1)
150824-WC1	24 (605)	40.50 (1028,7)	43.00 (1092,2)	3.380 (85,8)	9	20	42.16 (1071)	47.0 (21,3)
150830-WC1	30 (760)	48.25 (1225,5)	50.75 (1289,0)	3.500 (88,9)	11	24	49.91 (1268)	54.0 (24,5)
150836-WC1	36 (910)	55.75 (1416,0)	58.25 (1479,5)	1.625 (41,1)	14	30	57.41 (1458)	61.0 (27,7)
150848-WC1	48 (1215)	71.25 (1809,7)	73.75 (1873,2)	1.875 (47,6)	18	38	72.91 (1852)	75.0 (34,0)

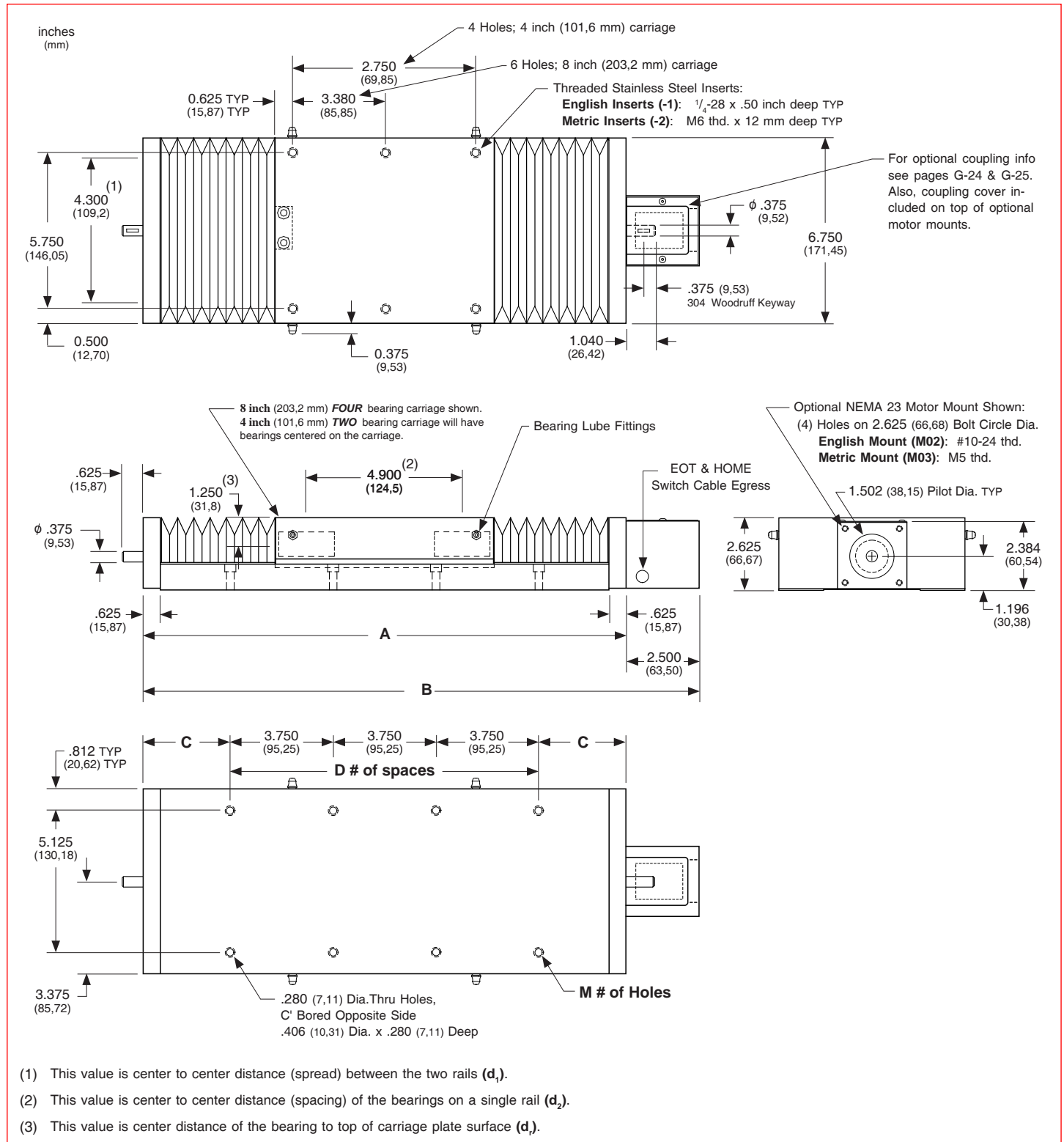
04 = 4 inch (101,6 mm) carriage length; 2 bearings; carriage weight = 4.0 lbs. (1,81 kg)
 08 = 8 inch (203,2 mm) carriage length; 4 bearings; carriage weight = 7.0 lbs. (3,17 kg)

Footnotes:

(1) Weight shown is with a 0.625 inch (16 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C100 style [0.09 lbs (0,04 kg)] coupling. When using a 0.750 inch (20 mm) diameter screw add 0.042 lbs per inch (0,00075 kg per mm) of screw length for a given model number.

Dimensions

- With Waycovers -



Note: Any 150 series table can be mounted on top of any second 150 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Contact **LINTECH**.

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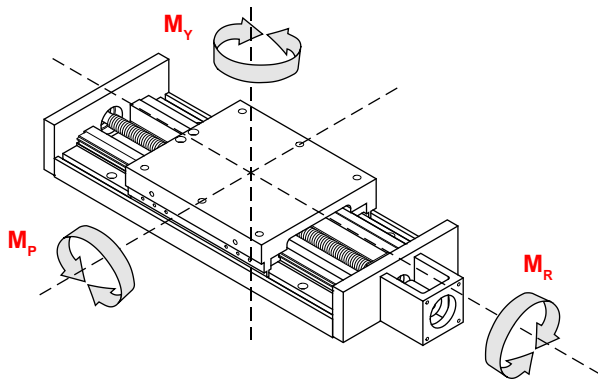
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Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 150 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

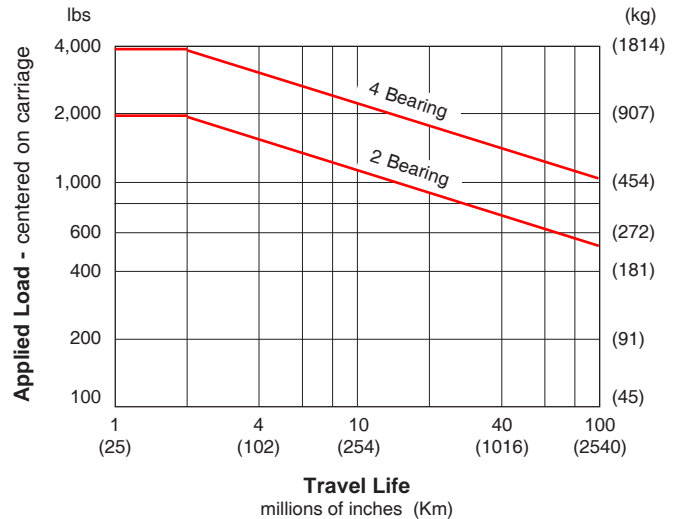
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	1,900	(862)	3,800	(1724)
50	(1270)	645	(293)	1,290	(585)
100	(2540)	510	(231)	1,020	(463)

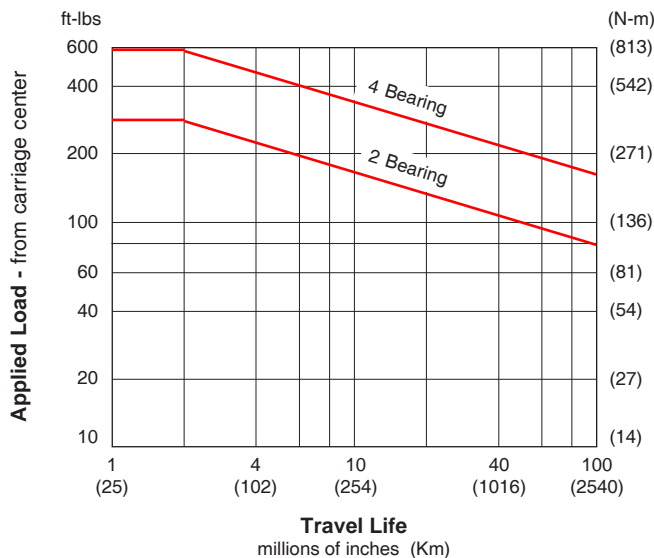


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	285	(386)	575	(780)
50	(1270)	98	(133)	196	(266)
100	(2540)	77	(104)	155	(210)

Ratings are based on $d_3 = 12$ inches (305 mm) & $d_4 = 0$

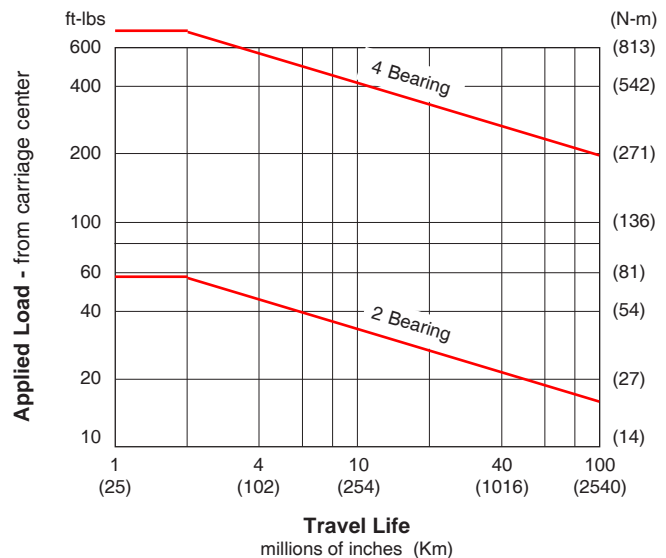


Dynamic Moment Load (M_P & M_Y) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	56	(76)	700	(949)
50	(1270)	19	(26)	239	(324)
100	(2540)	15	(20)	190	(258)

Ratings are based on $d_3 = 0$ & $d_4 = 12$ inches (305 mm)



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page G-12 for load/life capacity of the screw end support bearings.

Horizontal Application

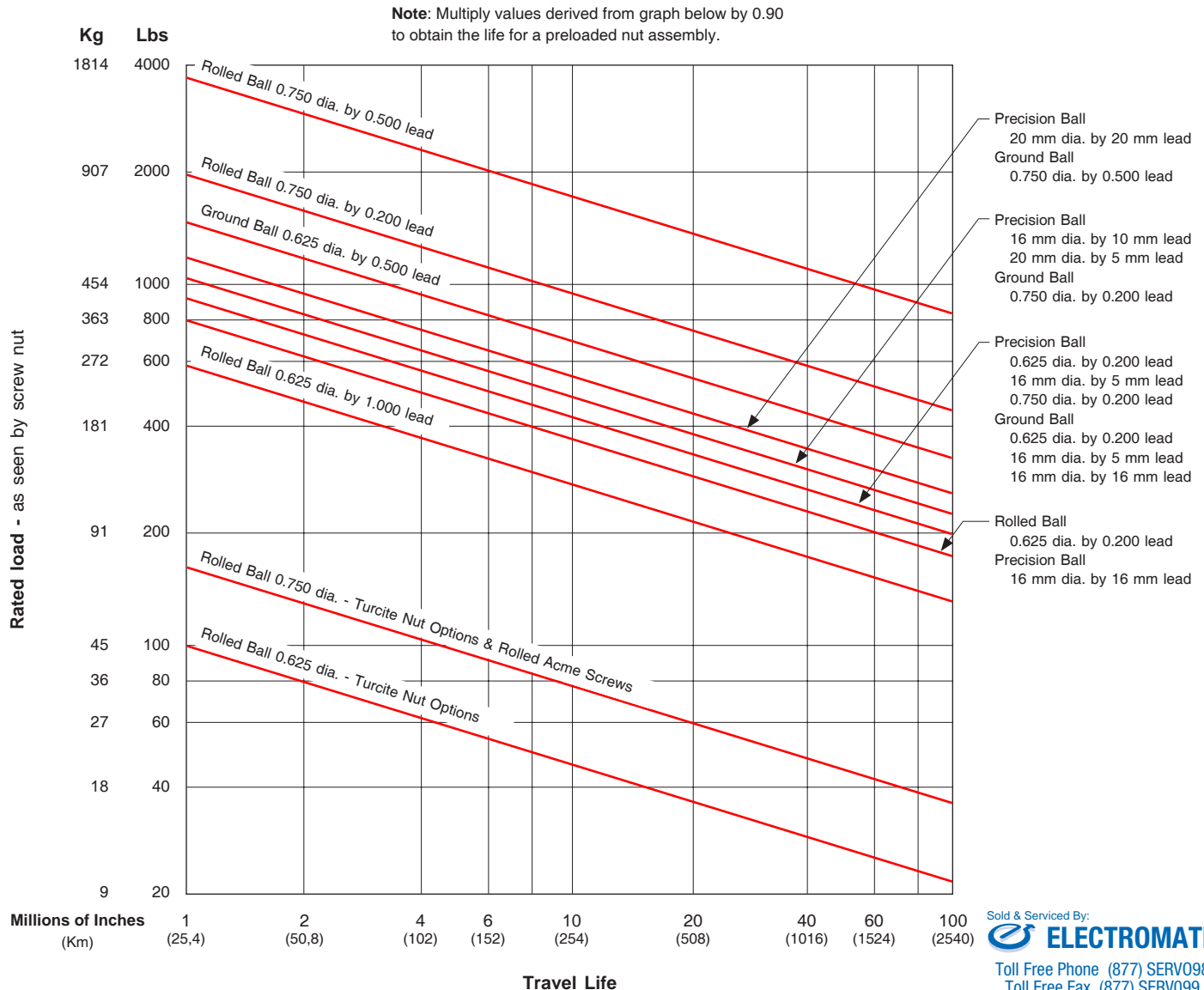
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (as seen by screw nut)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages G-21 to G-23)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)



Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page G-11 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

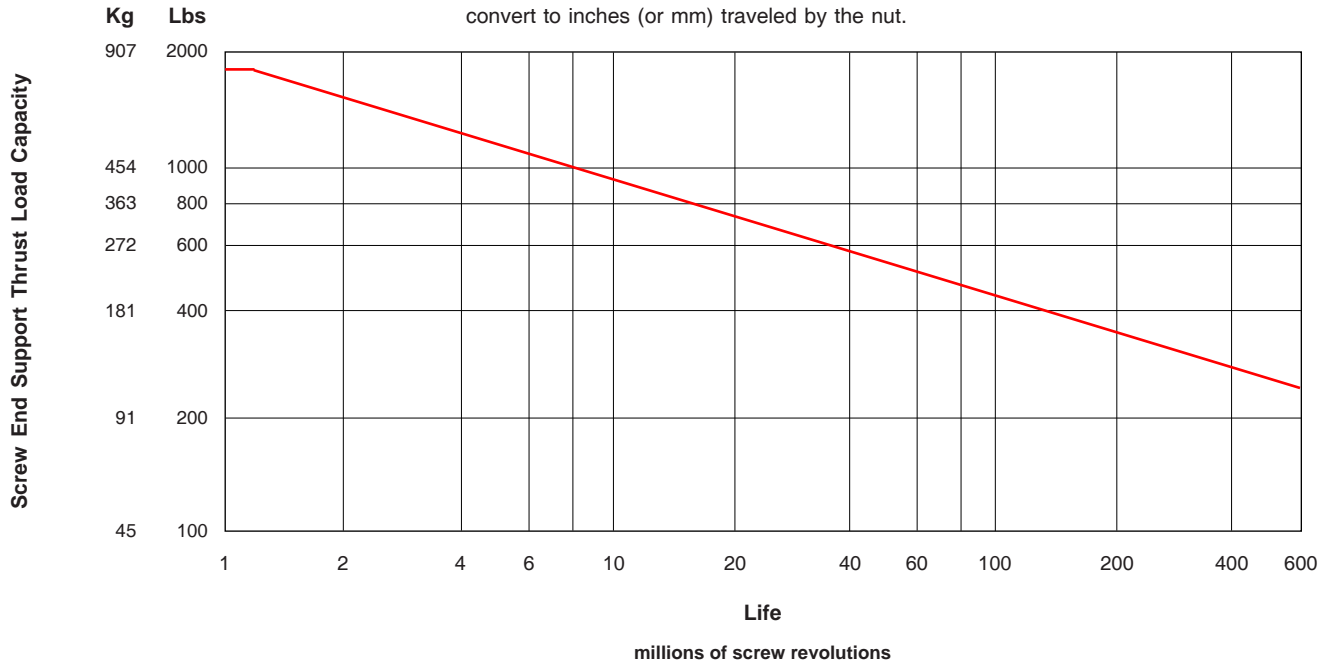
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	1,725 (782)	1,725 (782)	1,530 (694)	895 (406)	525 (238)	415 (188)	240 (109)

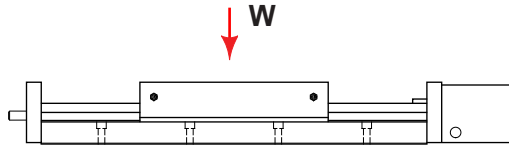
Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



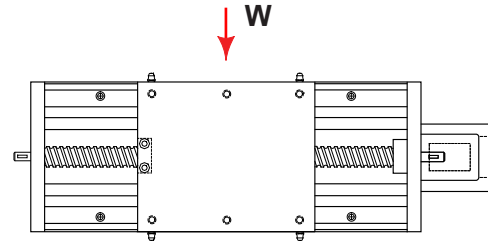
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$$I = 0.63 \text{ in}^4 \text{ (} 2.62 \times 10^5 \text{ mm}^4\text{)}$$

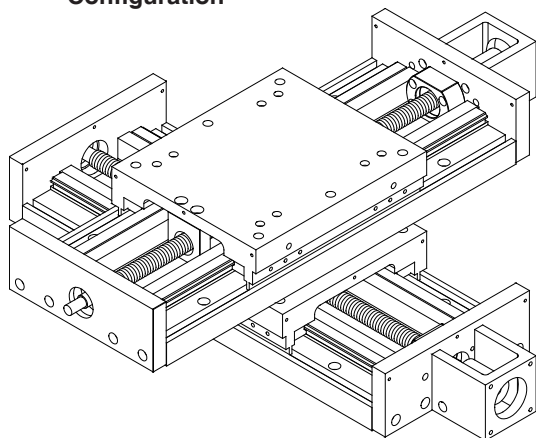
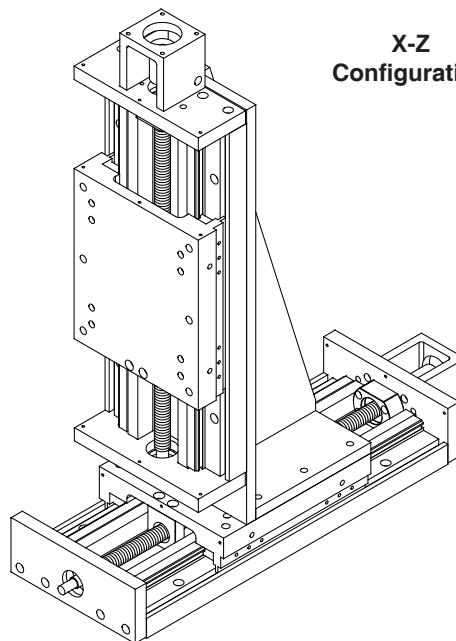
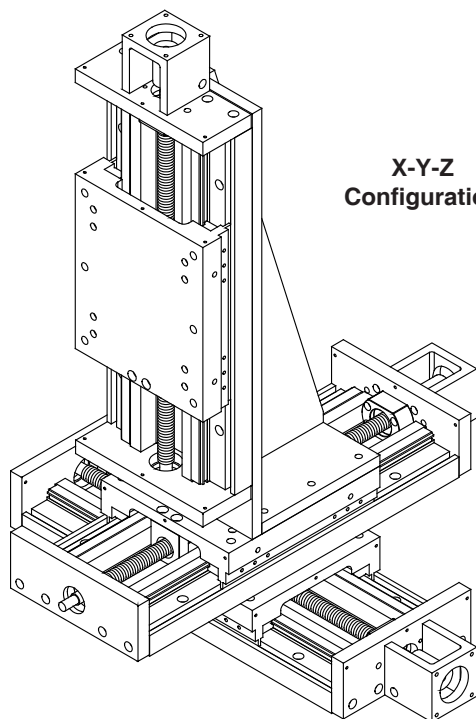


$$I = 23.5 \text{ in}^4 \text{ (} 97.8 \times 10^5 \text{ mm}^4\text{)}$$



Multi-Axis Configurations

LINTECH can provide various adapter plates, and vertical adapter brackets, to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations. There are literally hundreds of different possible configurations available. See below for some of the more common systems. *LINTECH* has a great deal of experience in dealing with multiple axis configurations. Sometimes different standard table series can be mounted together to form a custom system. Other times, a complete custom assembly is created, due to the application details. Contact *LINTECH* for more information.

X-Y
ConfigurationX-Z
ConfigurationX-Y-Z
Configuration

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Specifications Subject to Change Without Notice

End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 150 series table, each switch is mounted to the base of the table, while the actuating cams are mounted to the carriage assembly. Each switch is mounted to a plate that allows for a 0.625 inch (16 mm) adjustment range. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

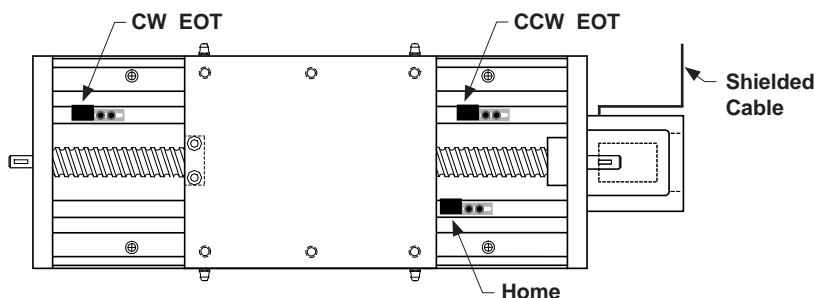
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located on the opposite side of the EOT switches, at the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 150-WC0 series, EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #. For the 150-WC1 series there is NO reduction of listed travel length when using EOT switches.

Note: Each switch bracket has a 0.625 inch (16 mm) adjustment range

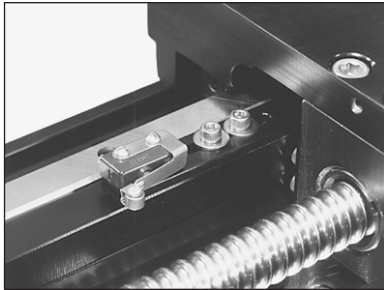
Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH*'s ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

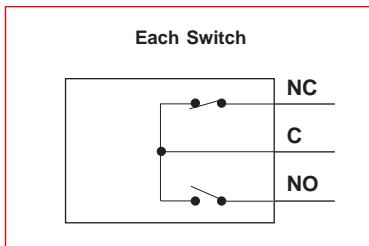
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End of Travel (EOT) Switches & Home Switch

Mechanical Switches

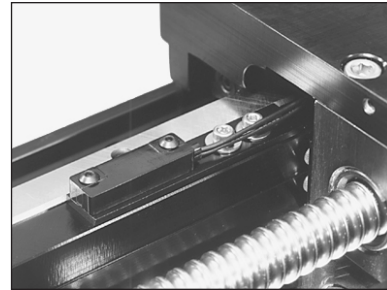
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 amps @ 125 VAC 1 amp @ 85 VDC
Activation Style	: mechanical cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 85° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: none



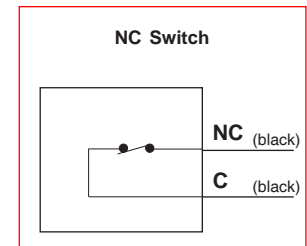
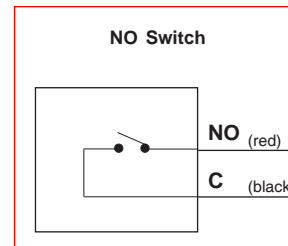
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT	NC
Blue	CW Common	
Red	CCW EOT	NC
White	CCW Common	
Brown	HOME	NO
Green	HOME Common	
Silver	Shield	

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches

Repeatability	: +/- 0.0020 inch (50 microns)
Electrical	: 1.0 amps @ 125 VAC 0.5 amps @ 100 VDC
Activation Style	: magnetic
Activation Area	: 0.30 inches (7,62 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

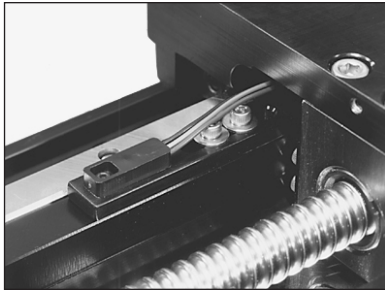
Wire Color	Description	
Black	CW EOT (black)	NC
Blue	CW Common (black)	
Red	CCW EOT (black)	NC
White	CCW Common (black)	
Brown	HOME (red)	NO
Green	HOME Common (black)	
Silver	Shield	

CW - Clockwise
CCW - Counter Clockwise
EOT - End of Travel
NC - Normally Closed
NO - Normally Open

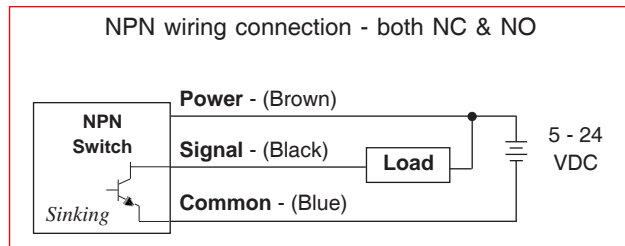
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End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



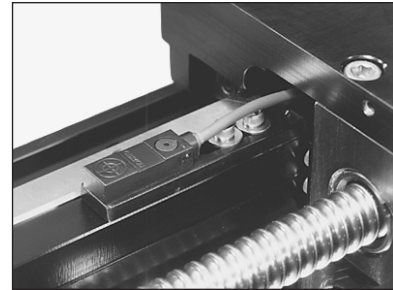
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 - 24 VDC 15 mA - power input 25 mA max - signal
Actuation Style	: magnetic
Activation Area	: 0.32 inches (8,13 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



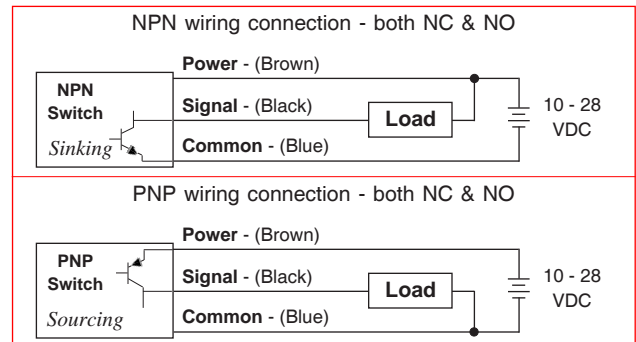
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is
ordered with any table) 10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 10 - 28 VDC 15 mA - power input 100 mA max - signal
Actuation Style	: non-magnetic cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 75° C
Environment	: IEC IP67 wash down
Added Table Width	: none
Individual Switch Wiring	: 6.5 foot (2 m) cable for NPN 3.3 foot (1 m) cable for PNP



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is
ordered with any table) 10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 150 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Screws - Acme & Ball

150-WC0 series		150-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)						
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw						
				0.625 dia. 0.100 lead	0.625 dia. 0.200 lead	0.625 dia. 0.500 lead	0.625 dia. 1.000 lead	16 mm dia. 5 mm lead	16 mm dia. 10 mm lead	16 mm dia. 16 mm lead
150408	8 (200)	150406	6 (150)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
150416	16 (400)	150412	12 (300)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
150423	23 (580)	150418	18 (455)	4.5 (114)	9.0 (229)	22.4 (569)	44.9 (1140)	8.8 (224)	17.5 (444)	28.0 (711)
150431	31 (785)	150424	24 (605)	2.8 (71)	5.6 (142)	13.9 (353)	27.9 (709)	5.4 (137)	10.8 (274)	17.4 (442)
150439	39 (990)	150430	30 (760)	1.9 (48)	3.8 (97)	9.5 (241)	19.0 (483)	3.7 (94)	7.4 (188)	11.8 (300)
150446	46 (1165)	150436	36 (910)	1.4 (35)	2.8 (71)	6.9 (175)	13.9 (353)	2.7 (69)	5.4 (137)	8.6 (218)
150462	62 (1570)	150448	48 (1215)	0.8 (20)	1.6 (40)	4.1 (104)	8.2 (208)	1.6 (41)	3.2 (81)	5.1 (130)
150808	8 (200)	150806	6 (150)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (188)	19.7 (500)	31.5 (800)
150816	16 (400)	150812	12 (300)	5.0 (127)	10.0 (254)	25.0 (635)	50.0 (1270)	9.8 (249)	19.7 (500)	31.5 (800)
150823	23 (580)	150818	18 (455)	3.5 (89)	6.9 (175)	17.3 (439)	34.6 (879)	6.7 (170)	13.5 (343)	21.6 (549)
150831	31 (785)	150824	24 (605)	2.3 (58)	4.5 (114)	11.3 (287)	22.6 (574)	4.4 (112)	8.8 (224)	14.1 (358)
150839	39 (990)	150830	30 (760)	1.6 (41)	3.2 (81)	8.0 (203)	15.9 (404)	3.1 (79)	6.2 (157)	9.9 (251)
150846	46 (1165)	150836	36 (910)	1.2 (30)	2.4 (61)	6.0 (152)	11.9 (302)	2.3 (58)	4.7 (119)	7.4 (188)
150862	62 (1570)	150848	48 (1215)	0.7 (17)	1.5 (38)	3.6 (91)	7.3 (185)	1.4 (35)	2.8 (71)	4.6 (117)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

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Screws - Acme & Ball

150-WC0 series		150-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)			
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw			
				0.750 dia. 0.200 lead	0.750 dia. 0.500 lead	20 mm dia. 5 mm lead	20 mm dia. 20 mm lead
150408	8 (200)	150406	6 (150)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
150416	16 (400)	150412	12 (300)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
150423	23 (580)	150418	18 (455)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
150431	31 (785)	150424	24 (600)	6.7 (170)	16.7 (424)	6.6 (168)	26.3 (668)
150439	39 (990)	150430	30 (760)	4.5 (114)	11.3 (287)	4.5 (114)	17.9 (455)
150446	46 (1165)	150436	36 (910)	3.3 (84)	8.3 (211)	3.3 (84)	13.1 (333)
150462	62 (1570)	150448	48 (1215)	2.0 (51)	4.9 (124)	1.9 (48)	7.8 (198)
150808	8 (200)	150806	6 (150)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
150816	16 (400)	150812	12 (300)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
150823	23 (580)	150818	18 (455)	8.3 (211)	20.7 (526)	8.2 (208)	32.7 (831)
150831	31 (785)	150824	24 (600)	5.4 (137)	13.5 (343)	5.3 (135)	21.4 (544)
150839	39 (990)	150830	30 (760)	3.8 (97)	9.5 (241)	3.8 (97)	15.1 (384)
150846	46 (1165)	150836	36 (910)	2.8 (71)	7.1 (180)	2.8 (71)	11.3 (287)
150462	62 (1570)	150848	48 (1215)	1.7 (43)	4.4 (112)	1.7 (43)	6.9 (175)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S005)	800 (363)	6,150 (2790)	90	10 (0,07)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S006)	720 (326)	6,070 (2753)		20 (0,14)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S007)	100 (45)	800 (363)	60	15 (0,11)		< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> Turcite Nut (S008)	90 (41)	800 (363)		30 (0,21)		0	+ 0.0002 to - 0.0002 (5) (5)
0.625 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S009)	590 (267)	2,425 (1100)	90	25 (0,18)	< 0.004 (100)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S010)	530 (240)	2,390 (1084)		40 (0,28)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S011)	100 (45)	800 (363)	60	35 (0,25)		< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> Turcite Nut (S012)	90 (41)	800 (363)		60 (0,42)		0	+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S013)	1,900 (862)	18,800 (8527)	90	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S014)	1,710 (776)	18,610 (8441)		30 (0,21)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S015)	195 (88)	1,500 (680)	60	25 (0,18)		< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> Turcite Nut (S016)	175 (79)	1,500 (680)		40 (0,28)		0	+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S017)	3,450 (1565)	24,200 (10977)	90	25 (0,18)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S018)	3,150 (1429)	23,855 (10820)		40 (0,28)		0	+ 0.0002 to - 0.0002 (5) (5)
	<i>Non-preloaded</i> Turcite Nut (S019)	195 (88)	1,500 (680)	60	35 (0,25)		< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> Turcite Nut (S020)	175 (79)	1,500 (680)		60 (0,42)		0	+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 2.8 inch (71,1 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 150-WC0 (4 inch carriage) model versions. For the 150-WC1 (4 inch carriage) series, 6 inch (150 mm) listed travel, there is a 0.8 inch (20,3 mm) reduction of travel. All other 150-WC1 and all 8 inch carriage models do not have a reduction of travel.

Screws - Acme & Ball

SCREW		PRECISION BALL SCREWS							Bidirectional Repeatability inches (microns)	
		Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)		
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S114)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S115)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 5 mm lead	<i>Non-preloaded</i> (S116)	876 (397)	2,700 (1224)	90	10 (0,07)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	<i>Preloaded</i> (S117)	788 (357)	2,430 (1102)		20 (0,14)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 10 mm lead	<i>Non-preloaded</i> (S118)	1,080 (489)	2,630 (1192)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	⁽²⁾ <i>Preloaded</i> (S119)	972 (440)	2,365 (1072)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
16 mm dia. 16 mm lead	<i>Non-preloaded</i> (S120)	819 (371)	1,620 (734)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	⁽³⁾ <i>Preloaded</i> (S121)	737 (334)	1,455 (659)		35 (0,24)		0		+ 0.0002 to - 0.0002 (5) (5)	
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S122)	964 (437)	3,360 (1524)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	⁽⁴⁾ <i>Preloaded</i> (S123)	867 (393)	3,025 (1372)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
20 mm dia. 5 mm lead	<i>Non-preloaded</i> (S124)	1,070 (485)	3,990 (1809)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	⁽⁴⁾ <i>Preloaded</i> (S125)	960 (435)	3,590 (1628)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)	
20 mm dia. 20 mm lead	<i>Non-preloaded</i> (S128)	1,293 (586)	3,505 (1589)	90	25 (0,18)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)	
	⁽⁵⁾ <i>Preloaded</i> (S129)	1,160 (526)	3,150 (1428)		40 (0,28)		0		+ 0.0002 to - 0.0002 (5) (5)	

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.9 inch (22.9 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 150-WC0 (4 inch carriage) model versions. All 150-WC0 (8 inch carriages) and all 150-WC1 models do not have a reduction of travel.
- (3) There is a 1.1 inch (27.9 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 150-WC0 (4 inch carriage) model versions. All 150-WC0 (8 inch carriages) and all 150-WC1 models do not have a reduction of travel.
- (4) There is a 0.5 inch (12.7 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 150-WC0 (4 inch carriage) model versions. All 150-WC0 (8 inch carriages) and all 150-WC1 models do not have a reduction of travel.
- (5) There is a 1.7 inch (43.2 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 150-WC0 (4 inch carriage) model versions. All 150-WC0 (8 inch carriages) and all 150-WC1 models do not have a reduction of travel.

Screws - Acme & Ball

SCREW	GROUND BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.625 dia., 0.200 lead (2) <i>Preloaded</i> (S212)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)
0.625 dia., 0.500 lead (2) <i>Preloaded</i> (S213)	1430 (649)	4,191 (1901)	90	30 (0,21)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)
16 mm dia., 5 mm lead (2) <i>Preloaded</i> (S214)	987 (447)	3,080 (1397)	90	20 (0,14)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)
16 mm dia., 16 mm lead (2) <i>Preloaded</i> (S215)	910 (412)	1,800 (816)	90	35 (0,24)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)
0.750 dia., 0.200 lead (3) <i>Preloaded</i> (S216)	1,070 (485)	3,990 (1809)	90	25 (0,18)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)
0.750 dia., 0.500 lead (3) <i>Preloaded</i> (S217)	1,200 (544)	4,200 (1905)	90	35 (0,24)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5)

SCREW	ROLLED ACME SCREWS							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.625 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S300)	160 (73)	800 (363)	40	10 (0,07)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5)
	<i>Preloaded</i> (S301)	140 (64)	720 (327)		20 (0,14)	< 0.003 (75)		0
0.625 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S302)	160 (73)	800 (363)	40	15 (0,11)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5)
	<i>Preloaded</i> (S303)	140 (64)	720 (327)		30 (0,21)	< 0.003 (75)		0

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
(2) The 0.625 inch & 16 mm diameter Ground Ball Screw options are only available in travel lengths where the screw length is less than 47 inches (1194 mm).
(3) The 0.750 inch diameter Ground Ball Screw options are only available in travel lengths where the screw length is less than 47 inches (1194 mm).

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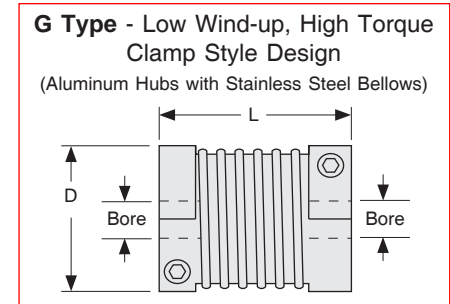
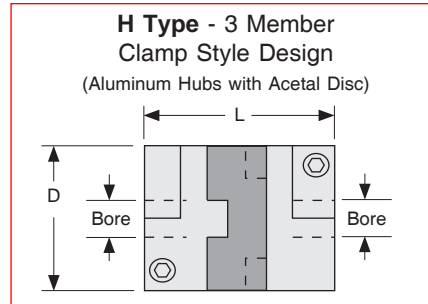
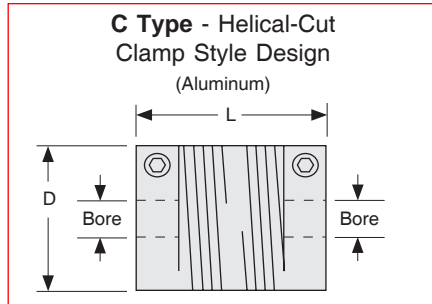
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Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model # (1)	D inches (mm)	L inches (mm)	Table	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
				Motor	Minimum (in) (mm)	Maximum (in) (mm)					
C100-375-aaa	1.00 (25,4)	1.50 (38,1)	375	aaa	.250 6	.375 10	1.5 (43)	.19 (35)	23.0 (0,9)	400 (2,8)	
C125-375-aaa	1.25 (31,8)	2.00 (50,8)	375	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)	
H100-375-aaa	1.00 (25,4)	1.28 (32,5)	375	aaa	.250 6	.375 10	1.2 (34)	.15 (27)	7.2 (0,28)	450 (2,8)	
H131-375-aaa	1.31 (33,3)	1.89 (48,0)	375	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)	
G100-375-aaa	0.99 (25,2)	1.26 (32,0)	375	aaa	.250 6	.500 12	1.3 (36)	.16 (29)	1.0 (0,39)	500 (3,5)	
G126-375-aaa	1.26 (32,1)	1.62 (41,0)	375	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)	
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch				005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm	012 = 12 mm 014 = 14 mm 016 = 16 mm					

Footnotes:

(1) See page G-25 for maximum coupling diameter and length specifications for use with the optional NEMA 23 & 34 motor mounts. Custom motor mounts can be provided upon request.

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

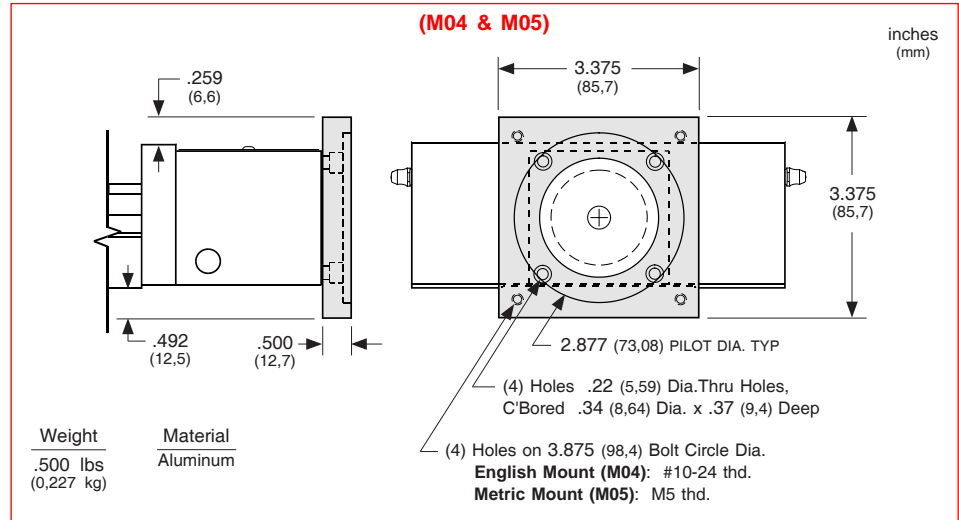
Specification	150 Series NEMA 23 bracket	150 Series NEMA 34 bracket
	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.375 (9,53)	0.375 (9,53)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)
Maximum coupling length	2.100 (53,34)	2.600 (66,04)
Note: Custom brackets available upon request.		

Coupling Part Numbers

C025 C100-375-250	C130 H100-375-250	C407 G100-375-250
C026 C100-375-375	C131 H100-375-375	C408 G100-375-375
C027 C100-375-006	C132 H100-375-006	C409 G100-375-500
C028 C100-375-008	C133 H100-375-008	C410 G100-375-006
C029 C100-375-010	C134 H100-375-010	C411 G100-375-008
		C412 G100-375-010
		C413 G100-375-012
C048 C125-375-250	C155 H131-375-250	C435 G126-375-250
C049 C125-375-375	C156 H131-375-375	C436 G126-375-375
C050 C125-375-500	C157 H131-375-500	C437 G126-375-500
C051 C125-375-006	C158 H131-375-625	C438 G126-375-625
C052 C125-375-008	C159 H131-375-006	C439 G126-375-006
C053 C125-375-010	C160 H131-375-008	C440 G126-375-008
C054 C125-375-012	C161 H131-375-010	C441 G126-375-010
C055 C125-375-014	C162 H131-375-012	C442 G126-375-012
	C163 H131-375-014	C443 G126-375-014
	C164 H131-375-016	C444 G126-375-016

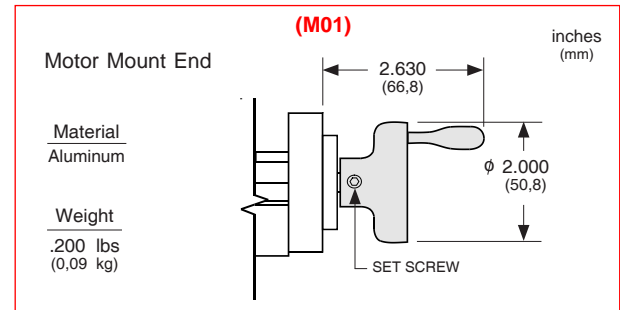
NEMA 34 Motor Mount

The NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



Hand Crank

For manually operated applications, *LINTECH* provides a hand crank option for the 150 table series. The hand crank replaces the motor mount and coupling on the table.

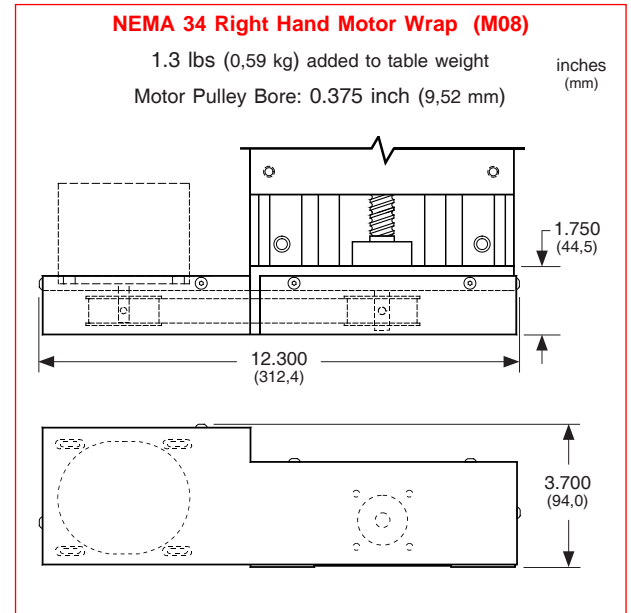
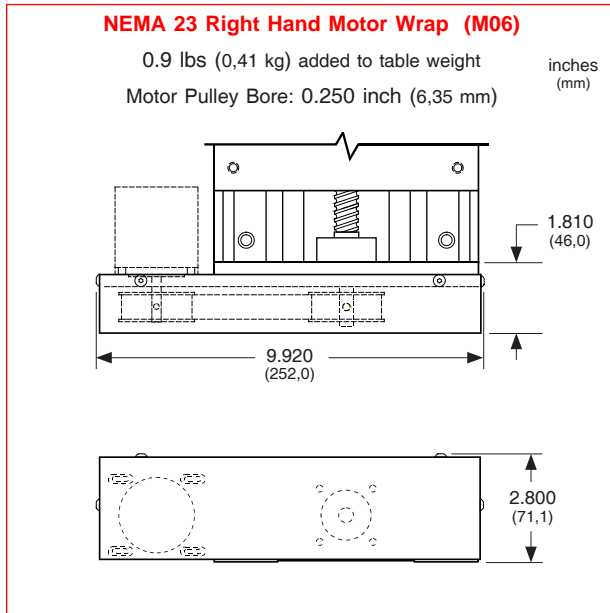


Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages

For space limited 150 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 23	1.65 (41,9)	7.5 (0,21)	1.65 (41,9)	7.5 (0,21)	1.0 (0,028)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)

Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores **MUST** be specified for non-NEMA motors.

Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 150 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

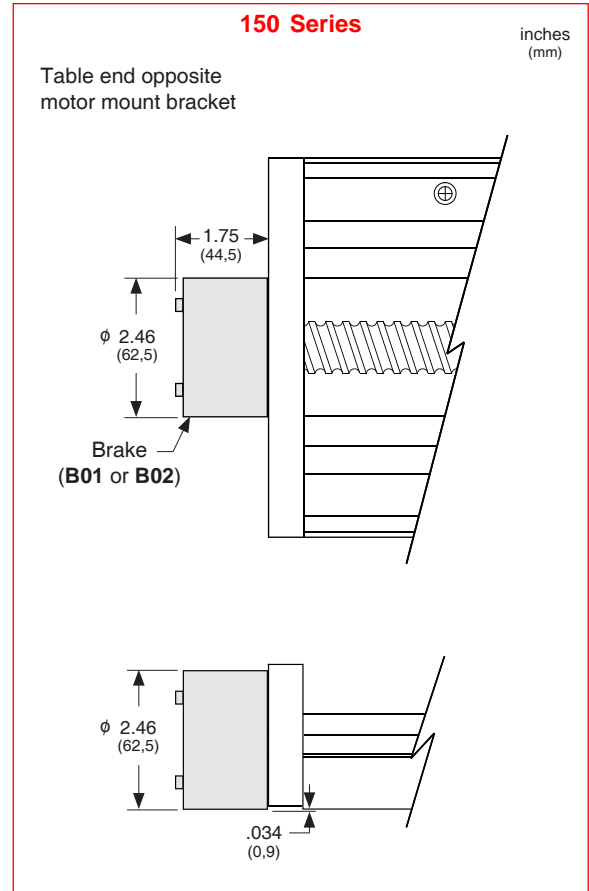
Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B01	18 (2,0)	24 VDC	0.733	1.4 (0,62)
B02	18 (2,0)	90 VDC	0.178	1.4 (0,62)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60



Linear & Rotary Incremental Encoders

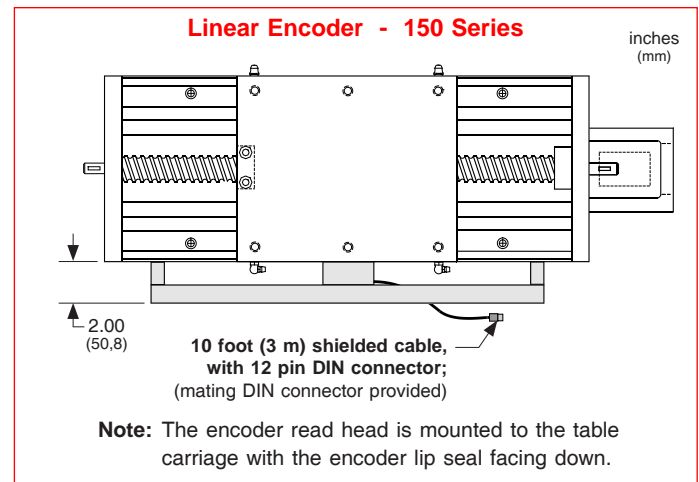
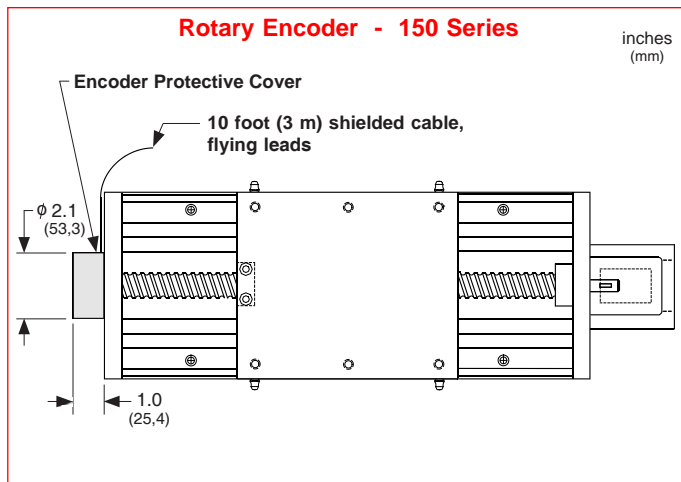
Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 150 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 150 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.

Sold & Serviced By:



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Toll Free Fax (877) SERV099
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sales@electromate.com

LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0,00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

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Specifications Subject to Change Without Notice

200 Series Positioning Tables



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Single or Multiple Axis

LINTECH's 200 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 200 series tables are designed with a low friction, preloaded, recirculating linear ball bearing system, which rides on a precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 22 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 200 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Vertical Angle Brackets

Optional vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Waycovers

For operator protection, these tables can be fitted with a protective bellows. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 200 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 23, NEMA 34, or any metric mount motor can be mounted to a 200 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

Other

The 200 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, **motor wrap packages** for space limited applications, and a **hand crank** for manually operated applications.

Standard Features - 200 Series

- ❑ Compact 8.500 inches (216 mm) wide by 3.750 inches (95 mm) tall
- ❑ Travel lengths from 6 inches (150 mm) to 55 inches (1395 mm)
- ❑ Threaded stainless steel inserts in carriage for load mounting
- ❑ 0° F to +185° F (-18° C to +85° C) operating temperature
- ❑ 2 rail, 2 & 4 bearing, 6 & 12 inch long carriages
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design

200-WC0 Series



200-WC1 Series



Options - 200 Series

- ❑ Chrome plated linear bearings, rails and screws
- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via the internet
- ❑ Adapter brackets for non-NEMA motors
- ❑ Linear and rotary incremental encoders
- ❑ NEMA 23 & 34 motor wrap packages
- ❑ NEMA 34 adapter bracket
- ❑ Power-off electric brakes
- ❑ Vertical angle bracket
- ❑ Turcite nut option
- ❑ Motor couplings
- ❑ Hand crank
- ❑ Ball screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.750 inch diameter, 0.200 inch lead
- 0.750 inch diameter, 0.500 inch lead

Precision - Non-preloaded & Preloaded Nuts:

- 0.750 inch diameter, 0.200 inch lead
- 20 mm diameter, 5 mm lead
- 20 mm diameter, 20 mm lead

Ground - Preloaded Nuts Only:

- 0.750 inch diameter, 0.200 inch lead
- 20 mm diameter, 5 mm lead
- 20 mm diameter, 20 mm lead

- ❑ Acme screws:

Rolled - Non-preloaded & Preloaded Nuts:

- 0.750 inch diameter, 0.100 inch lead
- 0.750 inch diameter, 0.200 inch lead

20 **06** **06** - **WC1** - **1** - **S013** - **M02** - **C165** - **L01** - **E00** - **B00**

Table Series

Carriage Length

06 - 6 inches **12** - 12 inches

Travel Length (see pages H-6 & H-8)

06 - 6 to 55 inches

Waycovers

WC0 - with no waycovers **WC1** - with waycovers

Carriage Inserts (see pages H-7 & H-9)

1 - English mount **2** - Metric mount

Screw Options (see pages H-18 to H-21)

Rolled ball screws

S013 - .750 x .200 NPL
S014 - .750 x .200 PL
S015 - .750 x .200 NPL(T)
S016 - .750 x .200 PL(T)
S017 - .750 x .500 NPL
S018 - .750 x .500 PL
S019 - .750 x .500 NPL(T)
S020 - .750 x .500 PL(T)

Precision ball screws

S122 - .750 x .200 NPL
S123 - .750 x .200 PL
S124 - 20 x 5 NPL
S125 - 20 x 5 PL
S128 - 20 x 20 NPL
S129 - 20 x 20 PL

Ground ball screws

S216 - .750 x .200 PL
S217 - .750 x .500 PL
S221 - 20 x 5 PL
S222 - 20 x 20 PL

Rolled acme screws

S306 - .750 x .100 NPL
S307 - .750 x .100 PL
S308 - .750 x .200 NPL
S309 - .750 x .200 PL

S999 - other

Motor Mount (see pages H-7 & H-9, H-24 to H-25)

M00 - none

M01 - hand crank

M99 - other

M02 - NEMA 23 mount (E)

M03 - NEMA 23 mount (M)

M04 - NEMA 34 mount (E)

M05 - NEMA 34 mount (M)

M08 - NEMA 34 (RH) wrap

M09 - NEMA 34 (LH) wrap

M10 - NEMA 42 mount (E)

M11 - NEMA 42 mount (M)

M12 - NEMA 42 (RH) wrap

M13 - NEMA 42 (LH) wrap

Coupling Options (see pages H-22 to H-23)

C000 - none

C999 - other

C056 to C063 - C125

C084 to C090 - C150

C165 to C174 - H131

C201 to C211 - H163

C445 to C454 - G126

C481 to C491 - G158

Limit & Home Switches (see pages H-15 to H-17)

L00 - no switches

L99 - other

EOT & home switches

EOT switches only

home switch only

Mechanical

L01

L02

L03

Reed

L04

L05

L06

Hall

L07

L08

L09

Prox (NPN)

L10

L11

L12

Prox (PNP)

L13

L14

L15

Encoder Options (see page H-27)

E00 - none

E01 - rotary (500 lines/rev)

E02 - rotary (1000 lines/rev)

E03 - rotary (1270 lines/rev)

E10 - linear (2500 lines/inch)

E11 - linear (125 lines/mm)

E99 - other

Power-off Brakes (see page H-26)

B00 - none

B03 - 24 VDC

B04 - 90 VDC

B99 - other

(E) - English Interface

(LH) - Left Hand

(M) - Metric Interface

(NPL) - Non Preloaded

(PL) - Preloaded

(RH) - Right Hand

(T) - Turcite Nut

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Specifications Subject to Change Without Notice

Specifications

Load Capacities		6 inch (2 bearing) Carriage		12 inch (4 bearing) Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	4,400 lbs	(1996 kg)	8,800 lbs	(3992 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	1,500 lbs	(680 kg)	3,000 lbs	(1360 kg)
Static Horizontal		7,600 lbs	(3447 kg)	15,200 lbs	(6895 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	790 ft-lbs	(1071 N-m)	1,580 ft-lbs	(2142 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	270 ft-lbs	(366 N-m)	540 ft-lbs	(732 N-m)
Static Roll Moment		1,365 ft-lbs	(1851 N-m)	2,730 ft-lbs	(3701 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	175 ft-lbs	(237 N-m)	2,485 ft-lbs	(3369 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	58 ft-lbs	(79 N-m)	845 ft-lbs	(1146 N-m)
Static Pitch & Yaw Moment		300 ft-lbs	(407 N-m)	4,300 ft-lbs	(5830 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	2,200 lbs	(998 kg)	2,200 lbs	(998 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	750 lbs	(340 kg)	750 lbs	(340 kg)
Each Bearing Static Load Capacity		3,800 lbs	(1724 kg)	3,800 lbs	(1724 kg)
Thrust Force Capacity	10 million screw revolutions	1,050 lbs	(476 kg)	1,050 lbs	(476 kg)
Thrust Force Capacity	500 million screw revolutions	270 lbs	(122 kg)	270 lbs	(122 kg)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	5.280 in	(134,1 mm)	5.280 in	(134,1 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	7.870 in	(199,9 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.900 in	(48,3 mm)	1.900 in	(48,3 mm)

Other	For 6 inch (2 bearing) & 12 inch (4 bearing) Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages H-18 to H-21)	Acme Screw - Stainless Steel
Screw Material (see pages H-18 to H-21)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00004 in/in (< 1,02 microns/25mm)
Flatness	< 0.00004 in/in (< 1,02 microns/25mm)
Orthogonality (multi-axis systems)	< 15 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows firmly mounted to carriage & end plates

Dimensions & Specifications

- Without Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	M		
200607-WC0	7 (175)	14.75 (374,6)	17.25 (438,1)	2.120 (53,8)	3	8	16.37 (416)	38.3 (17,4)
200614-WC0	14 (355)	21.62 (549,1)	24.12 (612,6)	2.060 (52,3)	5	12	23.24 (590)	47.4 (21,5)
200621-WC0	21 (530)	28.50 (723,9)	31.00 (787,4)	2.000 (50,8)	7	16	30.12 (765)	56.5 (25,6)
200628-WC0	28 (710)	35.25 (895,3)	37.75 (958,8)	1.870 (47,5)	9	20	36.87 (936)	65.6 (29,8)
200635-WC0	35 (885)	42.25 (1073,1)	44.75 (1136,6)	1.870 (47,5)	11	24	43.87 (1114)	74.7 (33,9)
200641-WC0	41 (1040)	49.00 (1244,6)	51.50 (1308,1)	1.750 (44,4)	13	28	50.62 (1286)	83.8 (38,0)
200655-WC0	55 (1395)	62.75 (1593,8)	65.25 (1657,3)	1.620 (41,1)	17	36	64.37 (1635)	100.0 (45,4)
201207-WC0	7 (175)	20.75 (527,0)	23.25 (590,5)	1.620 (41,1)	5	12	22.37 (568)	54.3 (24,6)
201214-WC0	14 (355)	27.62 (701,5)	30.12 (765,0)	1.560 (39,6)	7	16	29.24 (743)	63.4 (28,8)
201221-WC0	21 (530)	34.50 (876,3)	37.00 (939,8)	1.500 (38,1)	9	20	36.12 (917)	72.5 (32,9)
201228-WC0	28 (710)	41.25 (1047,7)	43.75 (1111,2)	1.370 (34,8)	11	24	42.87 (1089)	81.6 (37,0)
201235-WC0	35 (885)	48.25 (1225,5)	50.75 (1289,0)	1.370 (34,8)	13	28	49.87 (1267)	90.7 (41,1)
201241-WC0	41 (1040)	55.00 (1397,0)	57.50 (1460,5)	1.250 (31,7)	15	32	56.62 (1438)	99.8 (45,3)
201255-WC0	55 (1395)	68.75 (1746,2)	71.25 (1809,7)	1.120 (28,4)	19	40	70.37 (1787)	117.0 (53,1)

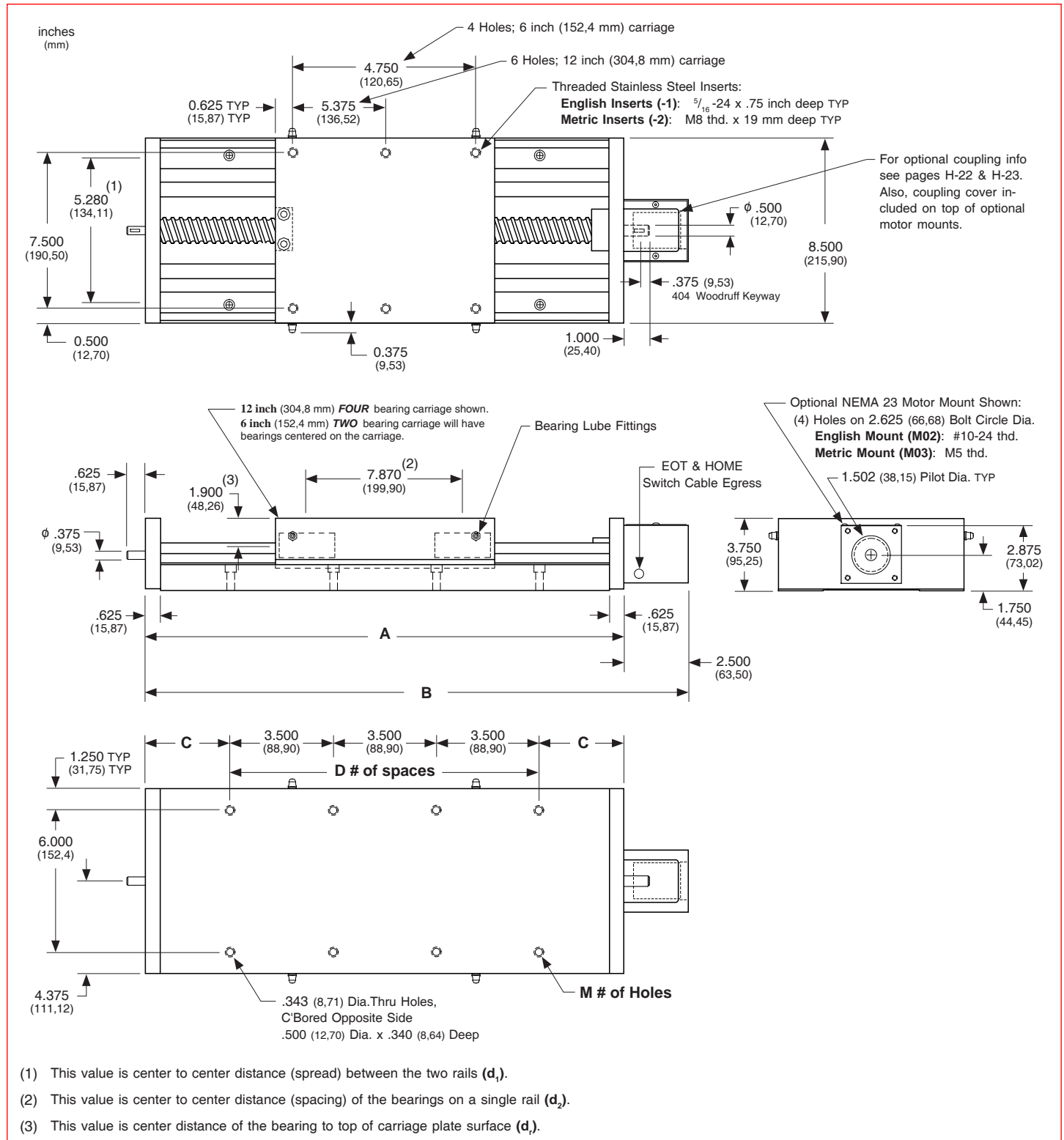
- └ 06 = 6 inch (152,4 mm) carriage length; 2 bearings; carriage weight = 11.0 lbs. (4,99 kg)
- └ 12 = 12 inch (304,8 mm) carriage length; 4 bearings; carriage weight = 19.0 lbs. (8,62 kg)

Footnotes:

(1) Weight shown is with a 0.750 inch (20 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C125 style [0.22 lbs (0,10 kg)] coupling.

Dimensions

- Without Waycovers -



Note: Any 200 series table can be mounted on top of any second 200 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Contact **LINTECH**.

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Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	M		
200606-WC1	6 (150)	14.75 (374,6)	17.25 (438,1)	2.120 (53,8)	3	8	16.37 (416)	40.0 (18,1)
200612-WC1	12 (300)	21.62 (549,1)	24.12 (612,6)	2.060 (52,3)	5	12	23.24 (590)	50.0 (22,7)
200618-WC1	18 (455)	28.50 (723,9)	31.00 (787,4)	2.000 (50,8)	7	16	30.12 (765)	60.0 (27,2)
200624-WC1	24 (605)	35.25 (895,3)	37.75 (958,8)	1.870 (47,5)	9	20	36.87 (936)	70.0 (31,8)
200630-WC1	30 (760)	42.25 (1073,1)	44.75 (1136,6)	1.870 (47,5)	11	24	43.87 (1114)	80.0 (36,3)
200636-WC1	36 (910)	49.00 (1244,6)	51.50 (1308,1)	1.750 (44,4)	13	28	50.62 (1286)	90.0 (40,8)
200648-WC1	48 (1215)	62.75 (1593,8)	65.25 (1657,3)	1.620 (41,1)	17	36	64.37 (1635)	108.0 (49,0)
201206-WC1	6 (150)	20.75 (527,0)	23.25 (590,5)	1.620 (41,1)	5	12	22.37 (568)	56.0 (25,4)
201212-WC1	12 (300)	27.62 (701,5)	30.12 (765,0)	1.560 (39,6)	7	16	29.24 (743)	66.0 (29,9)
201218-WC1	18 (455)	34.50 (876,3)	37.00 (939,8)	1.500 (38,1)	9	20	36.12 (917)	76.0 (34,5)
201224-WC1	24 (605)	41.25 (1047,7)	43.75 (1111,2)	1.370 (34,8)	11	24	42.87 (1089)	86.0 (39,0)
201230-WC1	30 (760)	48.25 (1225,5)	50.75 (1289,0)	1.370 (34,8)	13	28	49.87 (1267)	96.0 (43,6)
201236-WC1	36 (910)	55.00 (1397,0)	57.50 (1460,5)	1.250 (31,7)	15	32	56.62 (1438)	106.0 (48,1)
201248-WC1	48 (1215)	68.75 (1746,2)	71.25 (1809,7)	1.120 (28,4)	19	40	70.37 (1787)	125.0 (56,7)

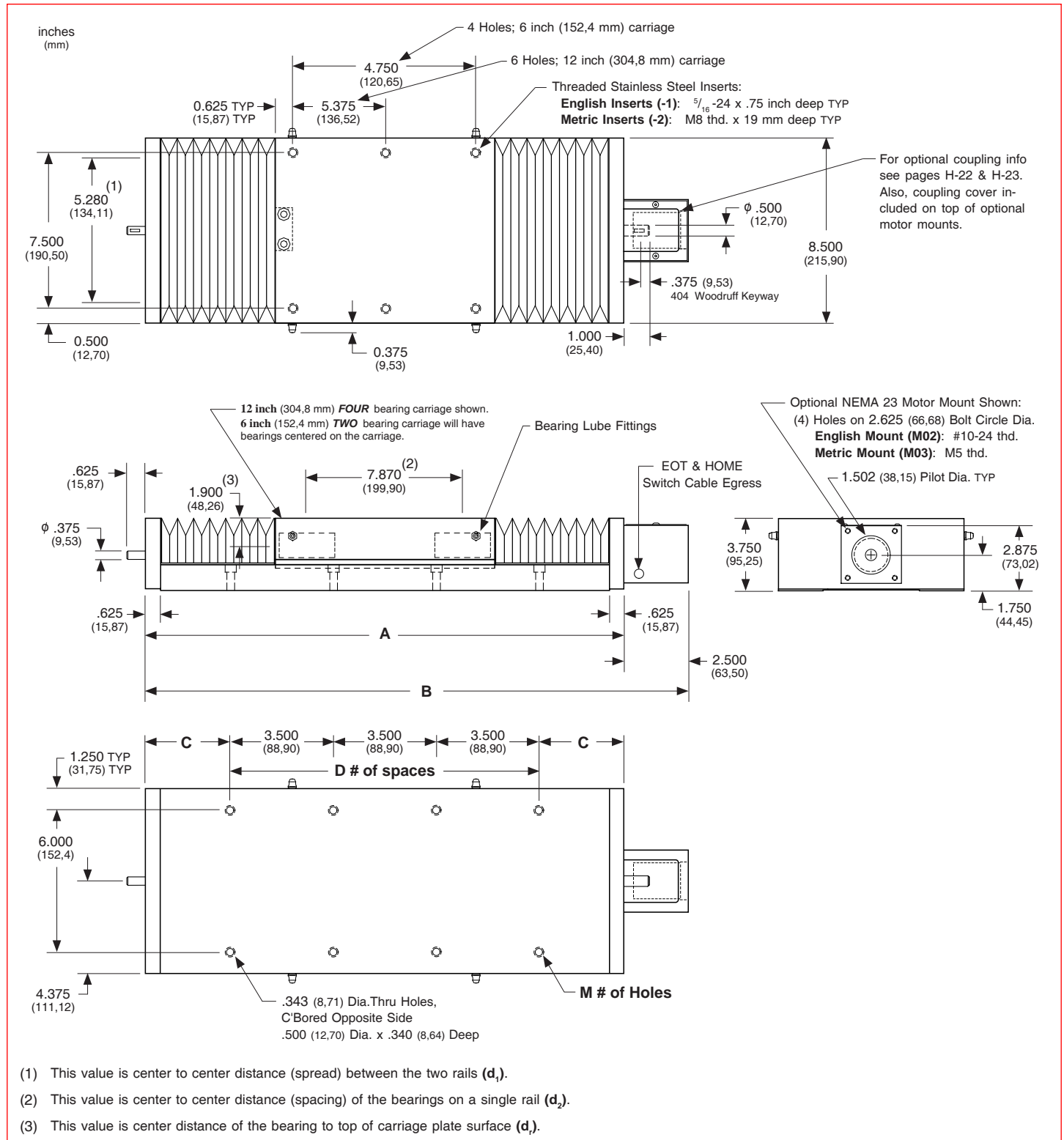
- └ 06 = 6 inch (152,4 mm) carriage length; 2 bearings; carriage weight = 11.0 lbs. (4,99 kg)
- └ 12 = 12 inch (304,8 mm) carriage length; 4 bearings; carriage weight = 19.0 lbs. (8,62 kg)

Footnotes:

(1) Weight shown is with a 0.750 inch (20 mm) diameter screw, a NEMA 23 motor mount [0.34 lbs (0,16 kg)], and a C125 style [0.22 lbs (0,10 kg)] coupling.

Dimensions

- With Waycovers -



Note: Any 200 series table can be mounted on top of any second 200 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Contact *LINTECH*.

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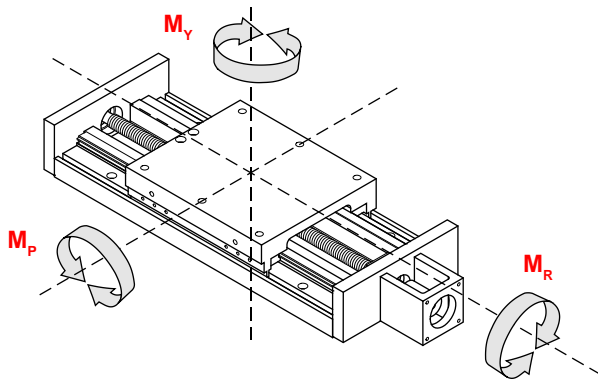
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Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 200 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

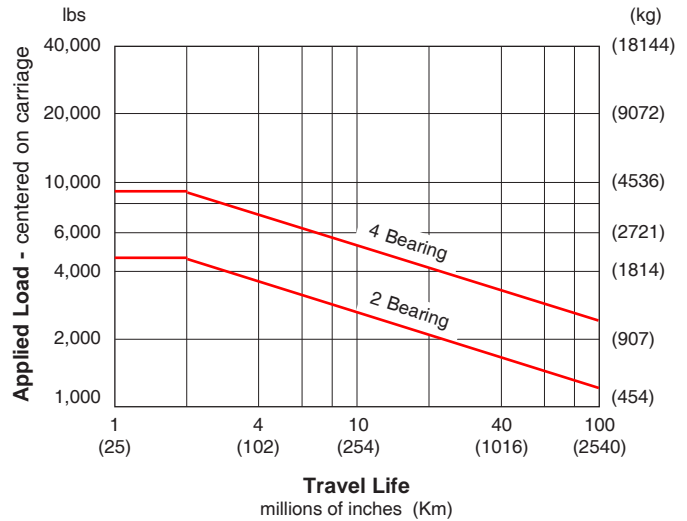
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	4,400	(1996)	8,800	(1724)
50	(1270)	1,500	(680)	3,000	(1360)
100	(2540)	1,180	(535)	2,360	(1070)

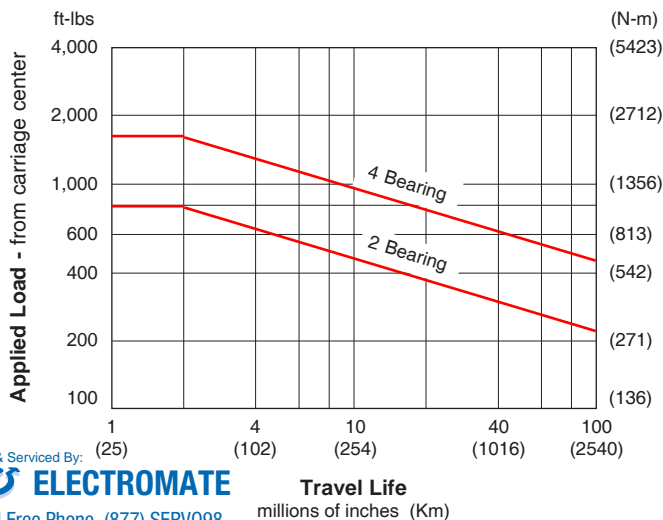


Dynamic Moment Load (M_r) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	790	(1071)	1,580	(2142)
50	(1270)	270	(366)	540	(732)
100	(2540)	210	(285)	425	(576)

Ratings are based on $d_3 = 12$ inches (305 mm) & $d_4 = 0$

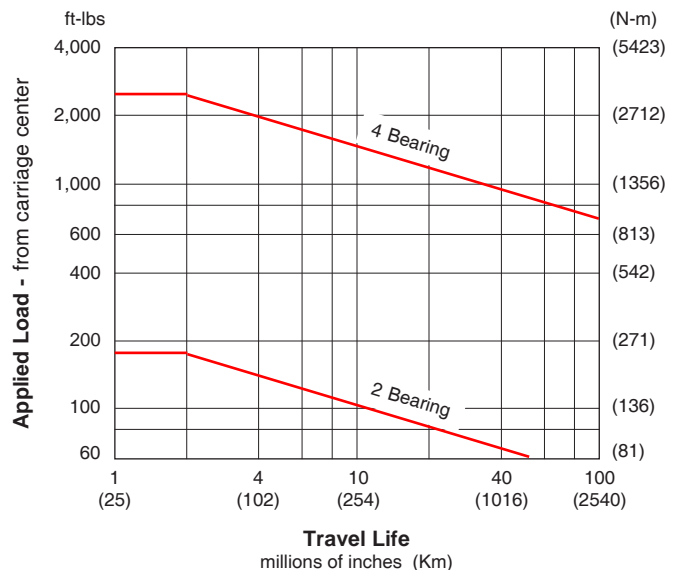


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	175	(237)	2,485	(3369)
50	(1270)	58	(79)	845	(1146)
100	(2540)	47	(64)	670	(908)

Ratings are based on $d_3 = 0$ & $d_4 = 12$ inches (305 mm)



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page H-12 for load/life capacity of the screw end support bearings.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

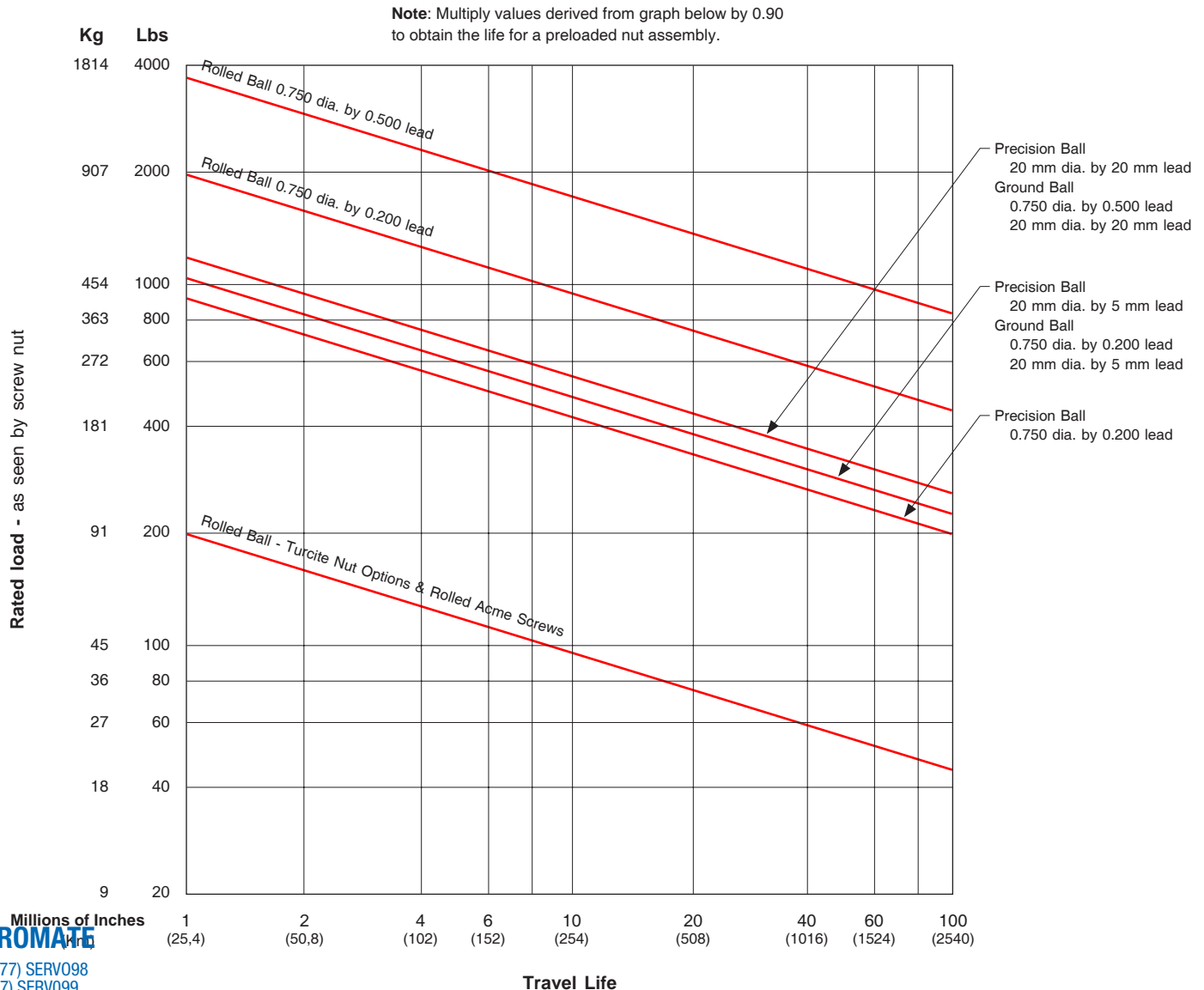
- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages H-20 & H-21)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$



Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page H-11 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

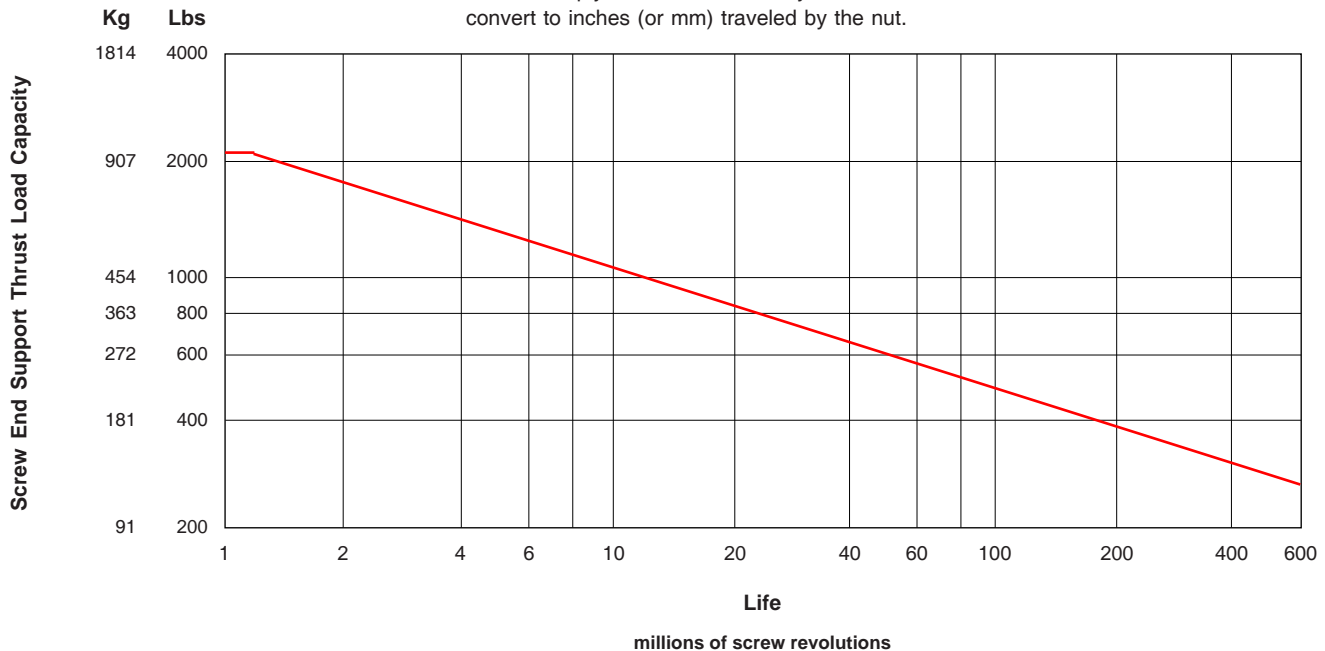
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	2,110 (957)	2,110 (957)	1,720 (780)	1,050 (476)	585 (265)	465 (211)	270 (122)

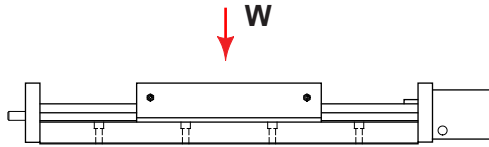
Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



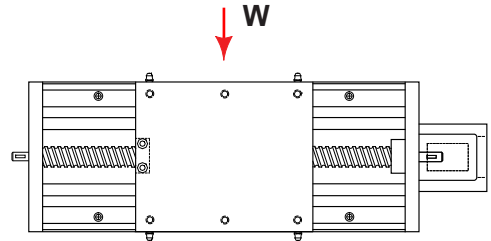
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$I = 2.08 \text{ in}^4 \text{ (} 8.66 \times 10^5 \text{ mm}^4\text{)}$

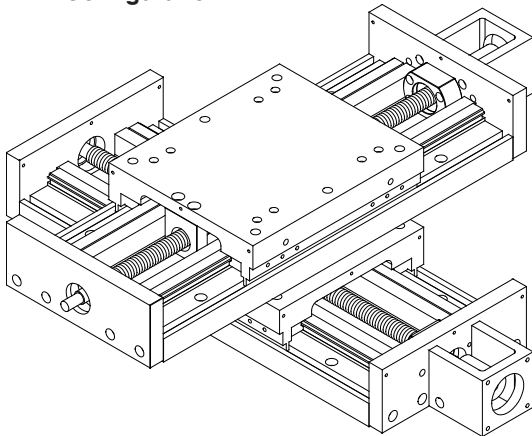
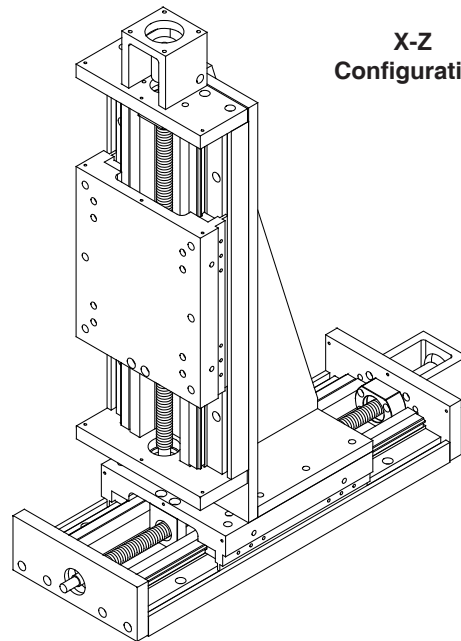
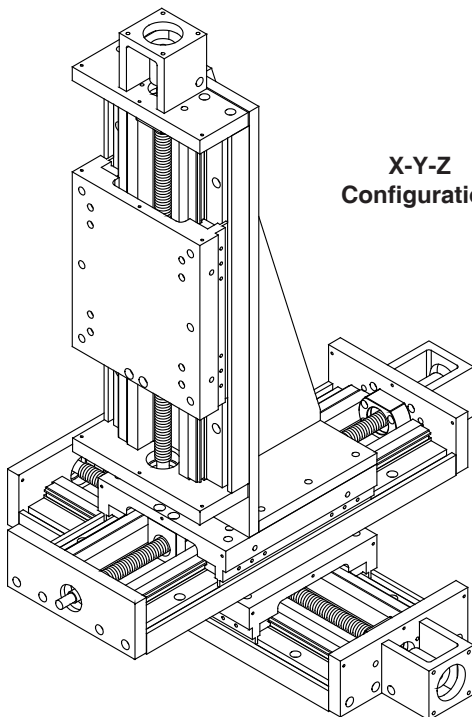


$I = 63.1 \text{ in}^4 \text{ (} 262.7 \times 10^5 \text{ mm}^4\text{)}$



Multi-Axis Configurations

LINTECH can provide various adapter plates, and vertical adapter brackets, to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations. There are literally hundreds of different possible configurations available. See below for some of the more common systems. *LINTECH* has a great deal of experience in dealing with multiple axis configurations. Sometimes different standard table series can be mounted together to form a custom system. Other times, a complete custom assembly is created, due to the application details. Contact *LINTECH* for more information.

X-Y
ConfigurationX-Z
ConfigurationX-Y-Z
Configuration

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End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 200 series table, each switch is mounted to the base of the table, while the actuating cams are mounted to the carriage assembly. Each switch is mounted to a plate that allows for a 0.625 inch (16 mm) adjustment range. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

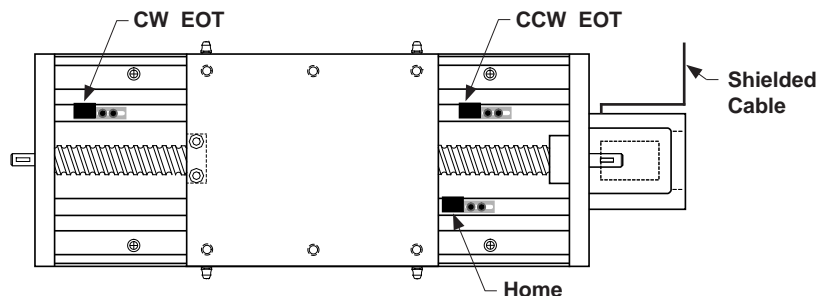
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located on the opposite side of the EOT switches, at the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 200-WC0 series, EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #. For the 200-WC1 series there is NO reduction of listed travel length when using EOT switches.

Note: Each switch bracket has a 0.625 inch (16 mm) adjustment range

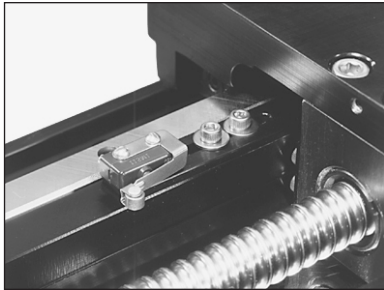
Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

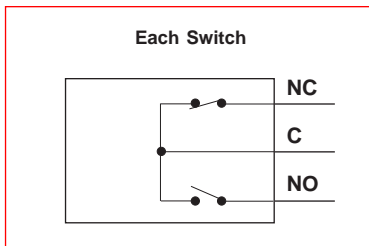
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End of Travel (EOT) Switches & Home Switch

Mechanical Switches

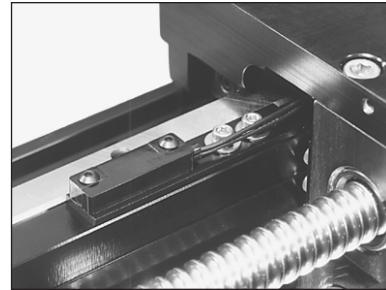
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 amps @ 125 VAC 1 amp @ 85 VDC
Activation Style	: mechanical cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 85° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: none



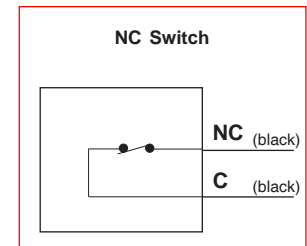
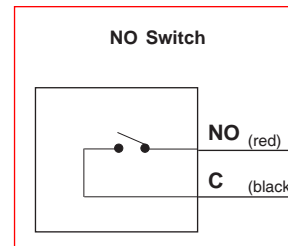
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT	NC
Blue	CW Common	
Red	CCW EOT	NC
White	CCW Common	
Brown	HOME	NO
Green	HOME Common	
Silver	Shield	

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches

Repeatability	: +/- 0.0020 inch (50 microns)
Electrical	: 1.0 amps @ 125 VAC 0.5 amps @ 100 VDC
Activation Style	: magnetic
Activation Area	: 0.30 inches (7,62 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT (black)	NC
Blue	CW Common (black)	
Red	CCW EOT (black)	NC
White	CCW Common (black)	
Brown	HOME (red)	NO
Green	HOME Common (black)	
Silver	Shield	

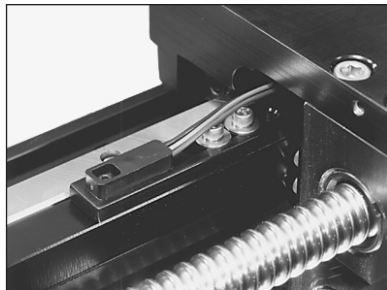
CW - Clockwise
CCW - Counter Clockwise
EOT - End of Travel
NC - Normally Closed
NO - Normally Open

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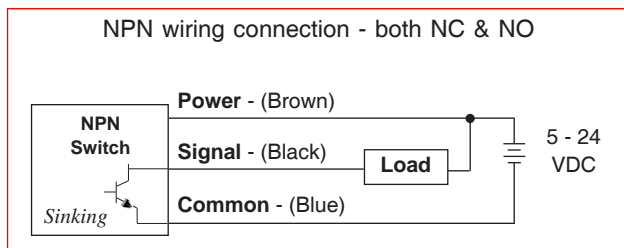
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End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



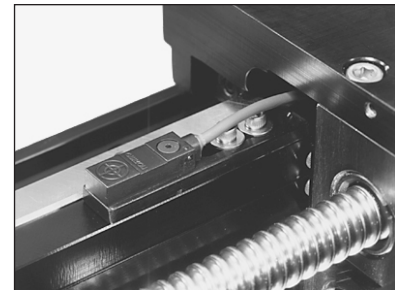
- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Added Table Width : none
- Individual Switch Wiring : 12 inch (305 mm) leads



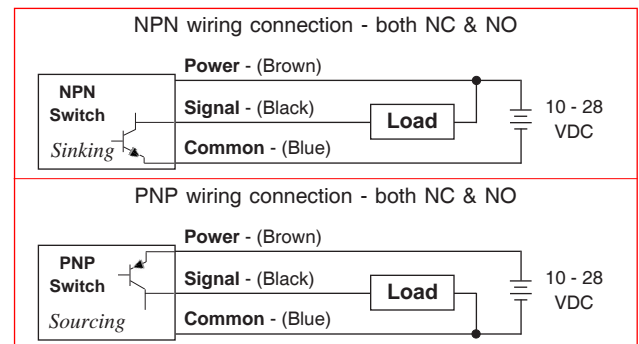
Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



- Repeatability : +/- 0.0002 inch (5 microns)
- Electrical : 10 - 28 VDC
15 mA - power input
100 mA max - signal
- Actuation Style : non-magnetic cam
- Activation Area : 1.75 inches (44,45 mm) of travel
- Temperature Range : - 25° C to + 75° C
- Environment : IEC IP67 wash down
- Added Table Width : none
- Individual Switch Wiring : 6.5 foot (2 m) cable for NPN
3.3 foot (1 m) cable for PNP



Standard *LINTECH* Wiring : from table end plate, 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads
(provided when switch option is ordered with any table)

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 200 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Screws - Acme & Ball

200-WC0 series		200-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)				
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw				
				0.750 dia. 0.100 lead	0.750 dia. 0.200 lead	0.750 dia. 0.500 lead	20 mm dia. 5 mm lead	20 mm dia. 20 mm lead
200607	7 (175)	200606	6 (150)	5.0 (127)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
200614	14 (355)	200612	12 (300)	5.0 (127)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
200621	21 (530)	200618	18 (455)	5.0 (127)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
200628	28 (710)	200624	24 (605)	3.6 (91)	7.1 (180)	17.9 (455)	7.1 (180)	28.2 (716)
200635	35 (885)	200630	30 (760)	2.5 (63)	5.0 (127)	12.4 (315)	4.9 (124)	19.7 (500)
200641	41 (1040)	200636	36 (910)	1.8 (46)	3.7 (94)	9.2 (234)	3.6 (91)	14.6 (371)
200655	55 (1395)	200648	48 (1215)	1.1 (28)	2.2 (56)	5.6 (142)	2.2 (56)	8.9 (226)
201207	7 (175)	201206	6 (150)	5.0 (127)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
201214	14 (355)	201212	12 (300)	5.0 (127)	10.0 (254)	25.0 (635)	9.8 (249)	39.3 (998)
201221	21 (530)	201218	18 (455)	3.7 (94)	7.5 (190)	18.7 (475)	7.4 (188)	29.5 (749)
201228	28 (710)	201224	24 (605)	2.6 (66)	5.2 (132)	13.0 (330)	5.1 (129)	20.6 (523)
201235	35 (885)	201230	30 (760)	1.9 (48)	3.8 (97)	9.5 (241)	3.8 (97)	15.1 (384)
201241	41 (1040)	201236	36 (910)	1.5 (38)	2.9 (74)	7.3 (185)	2.9 (74)	11.6 (295)
201255	55 (1395)	201248	48 (1215)	0.9 (23)	1.9 (48)	4.7 (119)	1.8 (46)	7.4 (188)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S013)	1,900 (862)	18,800 (8527)	90	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S014)	1,710 (776)	18,610 (8441)		30 (0,21)			
	<i>Non-preloaded</i> Turcite Nut (S015)	195 (88)	1,500 (680)	60	25 (0,18)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S016)	175 (79)	1,500 (680)		40 (0,28)	0	+ 0.0002 to - 0.0002 (5) (5)	
0.750 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S017)	3,450 (1565)	24,200 (10977)	90	25 (0,18)	< 0.003 (75)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)
	⁽²⁾ <i>Preloaded</i> (S018)	3,150 (1429)	23,855 (10820)		40 (0,28)			
	<i>Non-preloaded</i> Turcite Nut (S019)	195 (88)	1,500 (680)	60	35 (0,25)	< 0.008 (203)	+ 0.0002 to - 0.0082 (5) (208)	
	<i>Preloaded</i> Turcite Nut (S020)	175 (79)	1,500 (680)		60 (0,42)	0	+ 0.0002 to - 0.0002 (5) (5)	

SCREW	GROUND BALL SCREWS ⁽³⁾							
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)
0.750 dia., 0.200 lead <i>Preloaded</i> (S216)	1,070 (485)	3,990 (1809)	90	25 (0,18)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
0.750 dia., 0.500 lead <i>Preloaded</i> (S217)	1,200 (544)	4,200 (1905)	90	35 (0,24)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
20 mm dia., 5 mm lead <i>Preloaded</i> (S221)	1,070 (485)	3,990 (1809)	90	25 (0,18)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)
20 mm dia., 20 mm lead <i>Preloaded</i> (S222)	1,293 (586)	3,505 (1589)	90	35 (0,24)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 to - 0.0001 (2,5) (2,5)

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 0.8 inch (20,3 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 200-WC0 (6 inch carriage) model versions. All the 12 inch carriage model numbers and the 200-WC1 series are not affected.
- (3) The 0.750 inch & 20 mm diameter Ground Ball Screw options are only available in travel lengths where the screw length is less than 47 inches (1194 mm).

Screws - Acme & Ball

SCREW	PRECISION BALL SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S122)	964 (437)	3,360 (1524)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S123)	867 (393)	3,025 (1372)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
20 mm dia. 5 mm lead	<i>Non-preloaded</i> (S124)	1,070 (485)	3,990 (1809)	90	15 (0,11)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S125)	960 (435)	3,590 (1628)		25 (0,18)		0		+ 0.0002 to - 0.0002 (5) (5)
20 mm dia. 20 mm lead	<i>Non-preloaded</i> (S128)	1,293 (586)	3,505 (1589)	90	25 (0,18)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 to - 0.0032 (5) (81)
	<i>Preloaded</i> (S129)	1,160 (526)	3,150 (1428)		40 (0,28)		0		+ 0.0002 to - 0.0002 (5) (5)

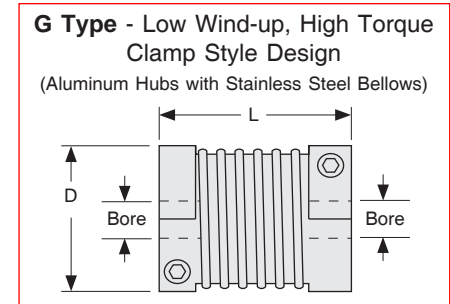
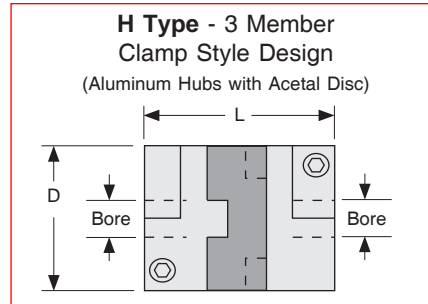
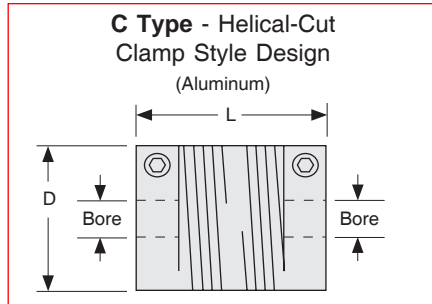
SCREW	ROLLED ACME SCREWS								
	Dyn. ⁽¹⁾ Capacity	Static Capacity	Screw Efficiency	Breakaway Torque	Position Accuracy	Backlash	Unidirectional Repeatability	Bidirectional Repeatability	
	lbs (kg)	lbs (kg)	%	oz-in (N-m)	inch/ft (microns/300 mm)	inches (microns)	inches (microns)	inches (microns)	
0.750 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S306)	200 (91)	1,000 (453)	40	15 (0,11)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S307)	180 (82)	900 (408)		30 (0,21)		0		+ 0.0002 to - 0.0002 (5) (5)
0.750 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S308)	200 (91)	1,000 (453)	40	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 to - 0.0082 (5) (208)
	<i>Preloaded</i> (S309)	180 (82)	900 (408)		40 (0,28)		0		+ 0.0002 to - 0.0002 (5) (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model #	D inches (mm)	L inches (mm)	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
			Table	Motor	Minimum (in) (mm)	Maximum (in) (mm)				
C125-500-aaa	1.25 (31,8)	2.00 (50,8)	500	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)
C150-500-aaa⁽¹⁾	1.50 (38,1)	2.37 (60,2)	500	aaa	.375 10	.625 16	5.5 (156)	1.54 (282)	13.0 (0,51)	950 (6,7)
H131-500-aaa	1.31 (33,3)	1.89 (48,0)	500	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)
H163-500-aaa⁽¹⁾	1.63 (41,4)	2.00 (50,8)	500	aaa	.375 10	.750 20	5.4 (153)	1.79 (328)	1.2 (0,047)	2,000 (14,1)
G126-500-aaa	1.26 (32,1)	1.62 (41,0)	500	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)
G158-500-aaa⁽¹⁾	1.58 (40,2)	1.85 (47,0)	500	aaa	.375 10	.750 20	4.3 (120)	1.34 (245)	0.2 (0,008)	2,400 (17,0)
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch		750 = .750 inch		005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm		012 = 12 mm 014 = 14 mm 016 = 16 mm 018 = 18 mm		019 = 19 mm 020 = 20 mm	

Footnotes:

- (1) This coupling option can not be used with the optional NEMA 23 and NEMA 34 motor mount because its diameter is too large or its length is too long. However, this coupling option can be used with the optional NEMA 42 motor mount. Custom motor mounts can be provided upon request. See page H-23 for maximum coupling diameter and length specifications for use with the optional NEMA 23, 34 & 42 motor mounts.

Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

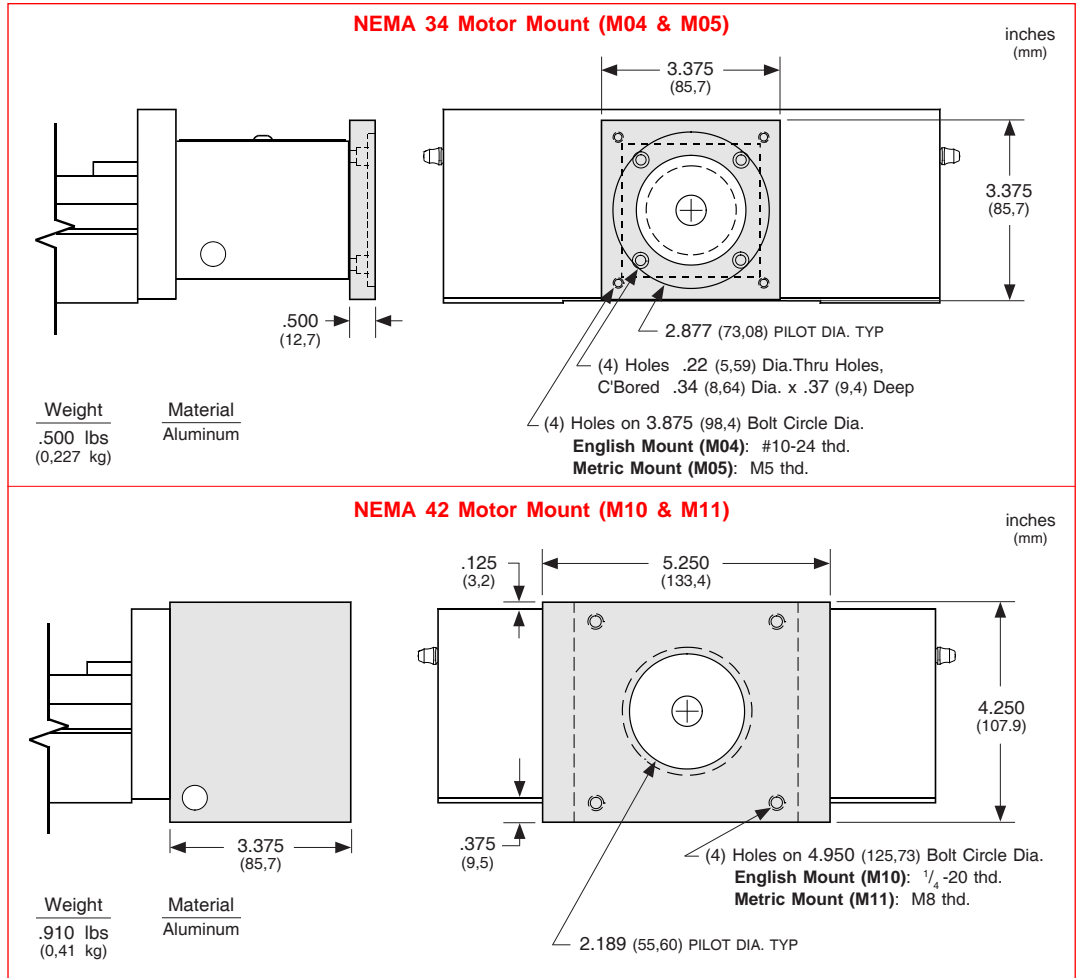
Specification	200 Series NEMA 23 bracket	200 Series NEMA 34 bracket	200 Series NEMA 42 bracket
	inches (mm)	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.500 (12,70)	0.500 (12,70)	0.500 (12,70)
Maximum coupling diameter	1.500 (38,10)	1.500 (38,10)	2.000 (50,80)
Maximum coupling length	2.100 (53,34)	2.600 (66,04)	2.500 (63,50)
Note: Custom brackets available upon request.			

Coupling Part Numbers

C056 C125-500-250	C165 H131-500-250	C445 G126-500-250
C057 C125-500-375	C166 H131-500-375	C446 G126-500-375
C058 C125-500-500	C167 H131-500-500	C447 G126-500-500
C059 C125-500-006	C168 H131-500-625	C448 G126-500-625
C060 C125-500-008	C169 H131-500-006	C449 G126-500-006
C061 C125-500-010	C170 H131-500-008	C450 G126-500-008
C062 C125-500-012	C171 H131-500-010	C451 G126-500-010
C063 C125-500-014	C172 H131-500-012	C452 G126-500-012
	C173 H131-500-014	C453 G126-500-014
	C174 H131-500-016	C454 G126-500-016
C084 C150-500-375		
C085 C150-500-500		
C086 C150-500-625	C201 H163-500-375	C481 G158-500-375
C087 C150-500-010	C202 H163-500-500	C482 G158-500-500
C088 C150-500-012	C203 H163-500-625	C483 G158-500-625
C089 C150-500-014	C204 H163-500-750	C484 G158-500-750
C090 C150-500-016	C205 H163-500-010	C485 G158-500-010
	C206 H163-500-012	C486 G158-500-012
	C207 H163-500-014	C487 G158-500-014
	C208 H163-500-016	C488 G158-500-016
	C209 H163-500-018	C489 G158-500-018
	C210 H163-500-019	C490 G158-500-019
	C211 H163-500-020	C491 G158-500-020

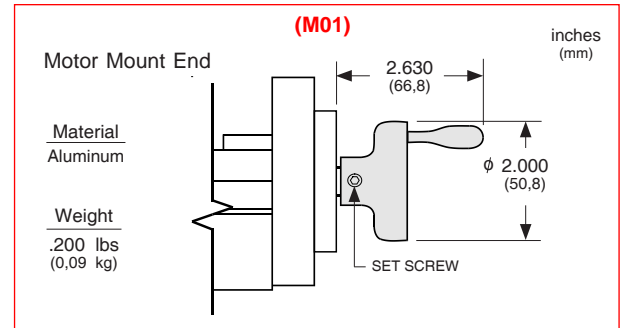
NEMA 34 & 42 Motor Mounts

The NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount. The NEMA 42 motor mount is a 3 piece bracket that mounts to the 200 series table. The brackets can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



Hand Crank

For manually operated applications, *LINTECH* provides a hand crank option for the 200 table series. The hand crank replaces the motor mount and coupling on the table.

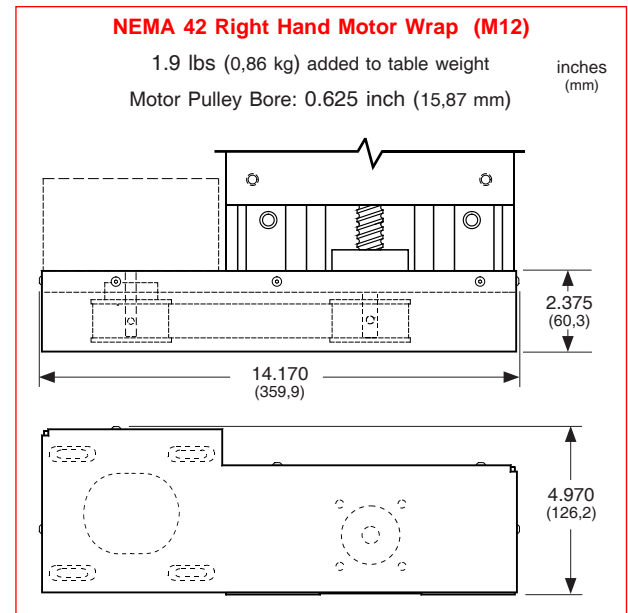
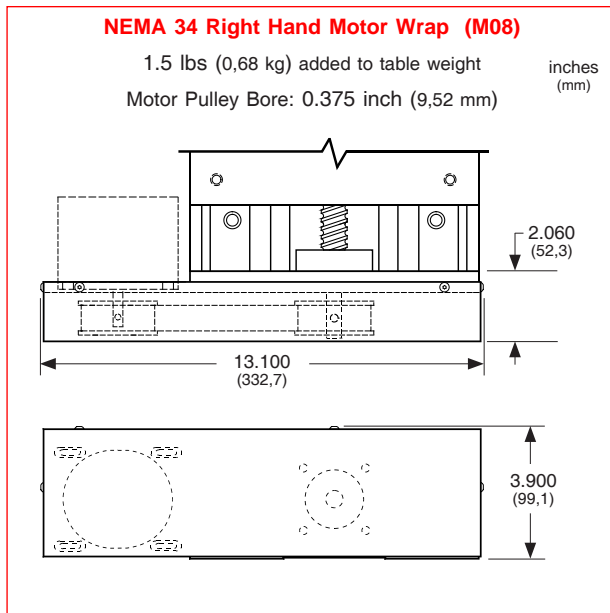


Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages

For space limited 200 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)
NEMA 42	2.12 (53,9)	19.2 (0,54)	2.12 (53,9)	19.2 (0,54)	3.0 (0,085)

Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores MUST be specified for non-NEMA motors.

Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 200 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

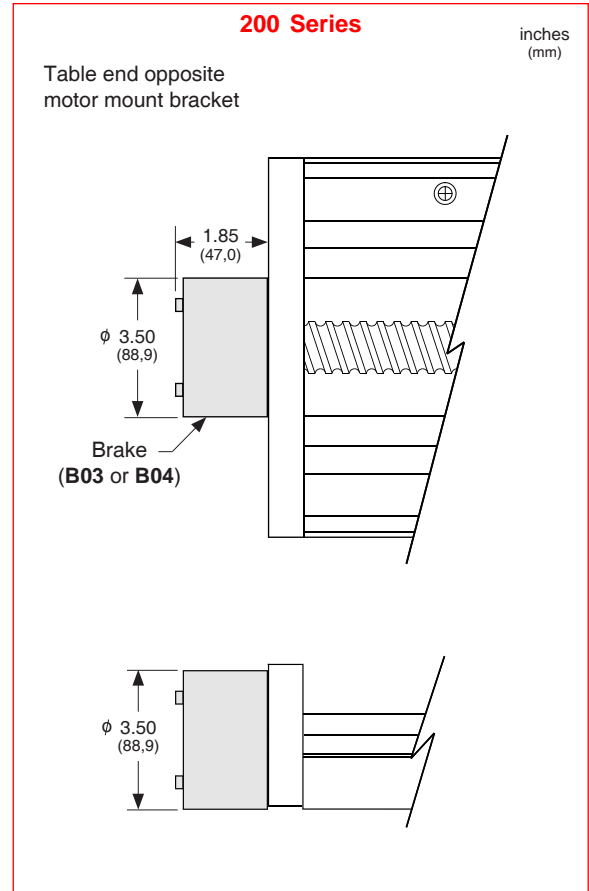
Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B03	84 (9,5)	24 VDC	0.973	3.3 (1,50)
B04	84 (9,5)	90 VDC	0.239	3.3 (1,50)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60



Linear & Rotary Incremental Encoders

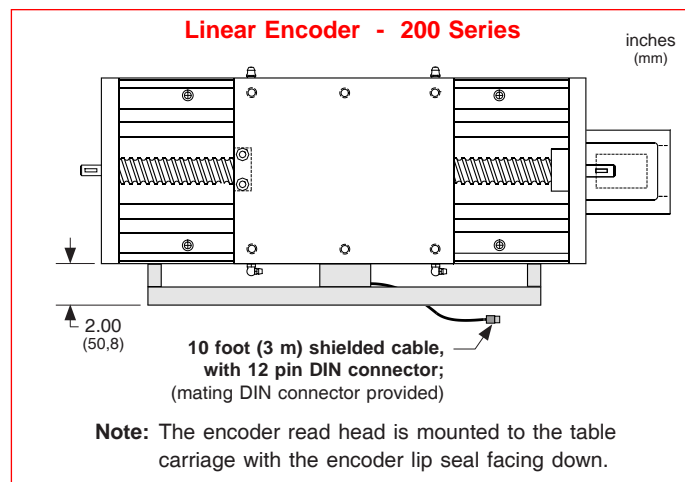
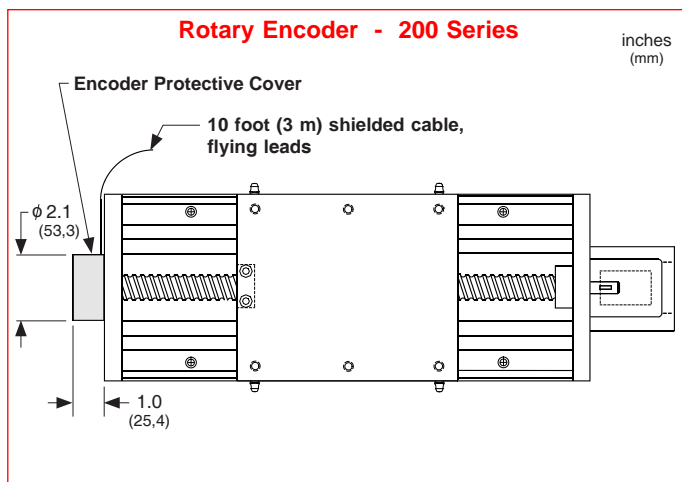
Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 200 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 200 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.

Sold & Serviced By:



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Toll Free Fax (877) SERV099
www.electromate.com
sales@electromate.com

LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

Sold & Serviced By:



Toll Free Phone (877) SERV098

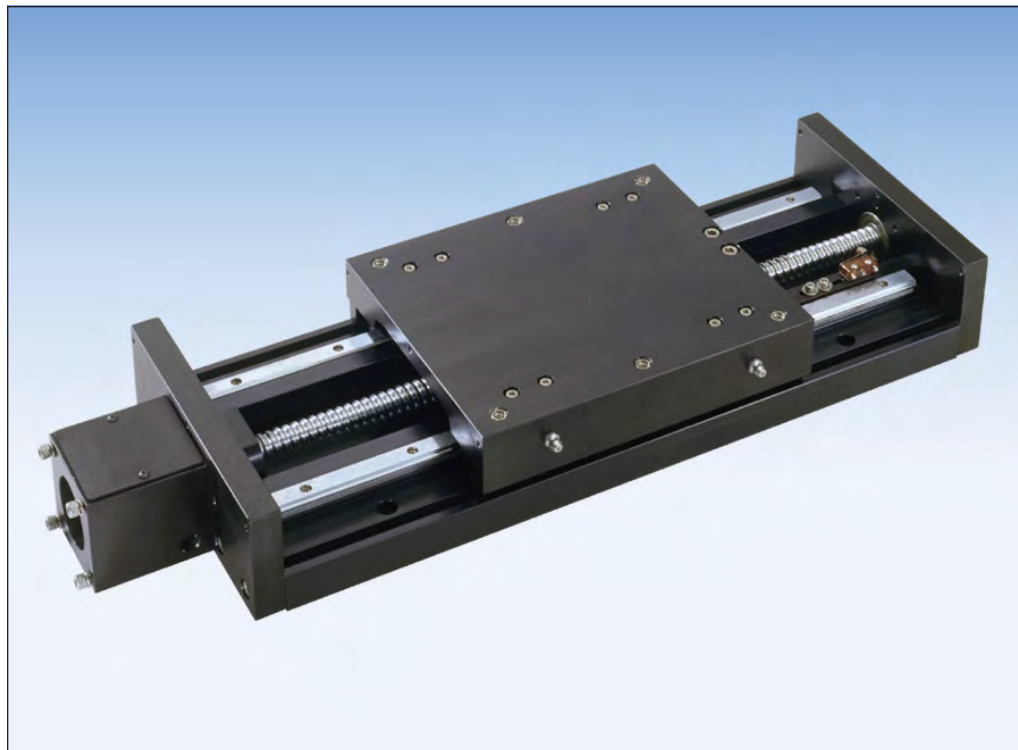
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Specifications Subject to Change Without Notice

250 Series Positioning Tables



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Single or Multiple Axis

LINTECH's 250 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- ❑ *Welding*
- ❑ *Test Stands*
- ❑ *Part Insertion*
- ❑ *Laser Positioning*
- ❑ *Liquid Dispensing*
- ❑ *Semiconductor Processing*
- ❑ *Gluing*
- ❑ *Pick & Place*
- ❑ *Part Scanning*
- ❑ *Inspection Stations*
- ❑ *General Automation*

Quality Construction

LINTECH's 250 series tables are designed with a low friction, preloaded, recirculating linear ball bearing system, which rides on a precision ground linear rails. The linear rails are mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has threaded stainless steel inserts for high strength and wear life. There are 25 different acme & ball screw options, that offer high efficiencies and long life at an economical price. These tables are designed to allow for numerous options. They include EOT & Home switches, linear & rotary encoders, power-off electric brakes, motor wrap packages and versatile mounting brackets for multiple axis applications.



Available Options

Acme Screws & Ball Screws

An assortment of acme screws and ball screws can be installed in the 250 series tables, providing solutions to load back driving, high duty cycle, high speed, extreme smoothness, and sensitive positioning applications.

Vertical Angle Brackets

Optional vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

Waycovers

For operator protection, these tables can be fitted with a protective bellows. The entire length of the lead screw and linear bearing system will be covered.

End of Travel and Home Switches

The 250 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Linear and Rotary Encoders

Incremental encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Motor Adapter Brackets

NEMA 34, NEMA 42, or any metric mount motor can be mounted to a 250 series positioning table with the use of adapter brackets.

Turcite Nut With Rolled Ball Screw

This solid polymer nut has no rolling elements in it, and performs very similar to an acme nut. It can provide smoother motion & less audible noise than most ball nuts, and is ideal for corrosive & vertical applications.

Other

The 250 series tables can accommodate **chrome plated linear bearings, rails, & screws** for corrosive environment applications, **power-off electric brakes** for load locking applications, and **motor wrap packages** for space limited applications.

25 **06** **06** - **WC1** - **1** - **S021** - **M04** - **C175** - **L01** - **E00** - **B00**

Table Series

Carriage Length

06 - 6 inches **12** - 12 inches

Travel Length (see pages I-6 & I-8)

06 - 6 to 56 inches

Waycovers

WC0 - with no waycovers **WC1** - with waycovers

Carriage Inserts (see pages I-7 & I-9)

1 - English mount **2** - Metric mount

Screw Options (see pages I-18 to I-21)

Rolled ball screws

- S021** - 1.000 x .250 NPL
- S022** - 1.000 x .250 PL
- S023** - 1.000 x .250 NPL(T)
- S024** - 1.000 x .250 PL(T)
- S025** - 1.000 x .500 NPL
- S026** - 1.000 x .500 PL
- S027** - 1.000 x .500 NPL(T)
- S028** - 1.000 x .500 PL(T)
- S029** - 1.000 x 1.000 NPL
- S030** - 1.000 x 1.000 PL
- S031** - 1.000 x 1.000 NPL(T)
- S032** - 1.000 x 1.000 PL(T)

Precision ball screws

- S130** - 1.000 x .200 NPL
- S131** - 1.000 x .200 PL
- S132** - 25 x 10 NPL
- S133** - 25 x 10 PL
- S134** - 25 x 25 NPL
- S135** - 25 x 25 PL

Ground ball screws

- S218** - 1.000 x .200 PL
- S219** - 1.000 x .500 PL
- S220** - 25 x 25 PL

Rolled acme screws

- S310** - 1.000 x .100 NPL
- S311** - 1.000 x .100 PL
- S312** - 1.000 x .200 NPL
- S313** - 1.000 x .200 PL

S999 - other

Motor Mount (see pages I-7 & I-9, I-24 to I-25)

- M00** - none
- M04** - NEMA 34 mount (E)
- M10** - NEMA 42 mount (E)
- M05** - NEMA 34 mount (M)
- M11** - NEMA 42 mount (M)
- M08** - NEMA 34 (RH) wrap
- M12** - NEMA 42 (RH) wrap
- M99** - other
- M09** - NEMA 34 (LH) wrap
- M13** - NEMA 42 (LH) wrap

Coupling Options (see pages I-22 to I-23)

- C000** - none
- C064 to C068** - C125
- C175 to C182** - H131
- C455 to C462** - G126
- C999** - other
- C091 to C097** - C150
- C212 to C222** - H163
- C492 to C502** - G158

Limit & Home Switches (see pages I-15 to I-17)

- | | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|------------|
| L00 - no switches | | Mechanical | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L01 | L04 | L07 | L10 | L13 |
| | EOT switches only | L02 | L05 | L08 | L11 | L14 |
| | home switch only | L03 | L06 | L09 | L12 | L15 |

Encoder Options (see page I-27)

- E00** - none
- E02** - rotary (1000 lines/rev)
- E10** - linear (2500 lines/inch)
- E99** - other
- E01** - rotary (500 lines/rev)
- E03** - rotary (1270 lines/rev)
- E11** - linear (125 lines/mm)

Power-off Brakes (see page I-26)

- B00** - none
- B05** - 24 VDC
- B06** - 90 VDC
- B99** - other

- (E) - English Interface
- (NPL) - Non Preloaded
- (LH) - Left Hand
- (PL) - Preloaded
- (M) - Metric Interface
- (RH) - Right Hand
- (T) - Turcite Nut

Specifications

Load Capacities		6 inch (2 bearing) Carriage		12 inch (4 bearing) Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	8,300 lbs	(3765 kg)	16,600 lbs	(7530 kg)
Dynamic Horizontal	50 million inches (1270 km) of travel	2,830 lbs	(1284 kg)	5,660 lbs	(2567 kg)
Static Horizontal		13,600 lbs	(6169 kg)	27,200 lbs	(12338 kg)
Dynamic Roll Moment	2 million inches (50 km) of travel	1,655 ft-lbs	(2244 N-m)	3,310 ft-lbs	(4488 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	560 ft-lbs	(759 N-m)	1,130 ft-lbs	(1532 N-m)
Static Roll Moment		2,715 ft-lbs	(3681 N-m)	5,425 ft-lbs	(7355 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	455 ft-lbs	(617 N-m)	3,930 ft-lbs	(5328 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	154 ft-lbs	(209 N-m)	1,340 ft-lbs	(1816 N-m)
Static Pitch & Yaw Moment		635 ft-lbs	(861 N-m)	6,450 ft-lbs	(8745 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	4,150 lbs	(1882 kg)	4,150 lbs	(1882 kg)
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	1,415 lbs	(642 kg)	1,415 lbs	(642 kg)
Each Bearing Static Load Capacity		6,800 lbs	(3084 kg)	6,800 lbs	(3084 kg)
Thrust Force Capacity	10 million screw revolutions	1,685 lbs	(764 kg)	1,685 lbs	(764 kg)
Thrust Force Capacity	500 million screw revolutions	455 lbs	(206 kg)	455 lbs	(206 kg)
Maximum Acceleration		386 in/sec ²	(9,8 m/sec ²)	772 in/sec ²	(19,6 m/sec ²)
d₁	Center to center distance (spread) between the two rails	6.000 in	(152,4 mm)	6.000 in	(152,4 mm)
d₂	Center to center distance (spacing) of the bearings on a single rail		-	6.730 in	(170,9 mm)
d_r	Center distance of the bearing to top of carriage plate surface	2.180 in	(55,4 mm)	2.180 in	(55,4 mm)

Other	For 6 inch (2 bearing) & 12 inch (4 bearing) Carriages
Table Material	Base, Carriage, End Plates, & Cover Plate option - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Screw Material (see pages I-18 to I-21)	Acme Screw - Stainless Steel
Screw Material (see pages I-18 to I-21)	Rolled Ball, Precision Ball, & Ground Ball - Case Hardened Steel
Straightness	< 0.00004 in/in (< 1,02 microns/25mm)
Flatness	< 0.00004 in/in (< 1,02 microns/25mm)
Orthogonality (multi-axis systems)	< 15 arc-seconds
Friction Coefficient	< 0.01
Motor Mount	NEMA 23 & 34 Mounts, Metric Mounts, Motor Wraps, and Hand Crank Option
Coupling	Three (3) different styles available
Waycover Material	Hypilon Polyester Bellows firmly mounted to carriage & end plates

Dimensions & Specifications

- Without Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table ⁽¹⁾ Weight lbs (kg)
		A	B	C	D	M		
250607-WC0	7.5 (190)	15.25 (387,3)	18.25 (463,5)	2.370 (60,2)	3	8	17.05 (433)	51.8 (23,5)
250614-WC0	14.5 (365)	22.12 (561,8)	25.12 (638,0)	2.310 (58,7)	5	12	23.92 (608)	65.6 (29,8)
250621-WC0	21.5 (545)	29.25 (742,9)	32.25 (819,1)	2.370 (60,2)	7	16	31.05 (789)	80.4 (36,5)
250628-WC0	28.5 (720)	36.12 (917,4)	39.12 (993,6)	2.310 (58,7)	9	20	37.92 (963)	95.2 (43,2)
250635-WC0	35.5 (900)	43.12 (1095,2)	46.12 (1171,4)	2.310 (58,7)	11	24	44.92 (1141)	110.0 (49,9)
250642-WC0	42.5 (1075)	50.12 (1273,0)	53.12 (1349,2)	2.310 (58,7)	13	28	51.93 (1319)	124.8 (56,7)
250656-WC0	56.0 (1420)	64.00 (1625,6)	67.00 (1701,8)	2.250 (57,1)	17	36	65.80 (1671)	153.4 (69,6)
251207-WC0	7.5 (190)	21.25 (539,7)	24.25 (615,9)	1.870 (47,5)	5	12	23.05 (585)	76.8 (34,8)
251214-WC0	14.5 (365)	28.12 (714,2)	31.12 (790,4)	1.810 (46,0)	7	16	29.93 (760)	91.6 (41,5)
251221-WC0	21.5 (545)	35.25 (895,3)	38.25 (971,5)	1.870 (47,5)	9	20	37.05 (941)	106.4 (48,3)
251228-WC0	28.5 (720)	42.12 (1069,8)	45.12 (1146,0)	1.810 (46,0)	11	24	43.92 (1116)	121.2 (55,0)
251235-WC0	35.5 (900)	49.12 (1247,6)	52.12 (1323,8)	1.810 (46,0)	13	28	50.92 (1293)	136.0 (61,7)
251242-WC0	42.5 (1075)	56.12 (1425,4)	59.12 (1501,6)	1.810 (46,0)	15	32	57.92 (1471)	149.8 (67,9)
251256-WC0	56.0 (1420)	70.00 (1778,0)	73.00 (1854,2)	1.750 (44,4)	19	40	71.80 (1824)	179.4 (81,4)

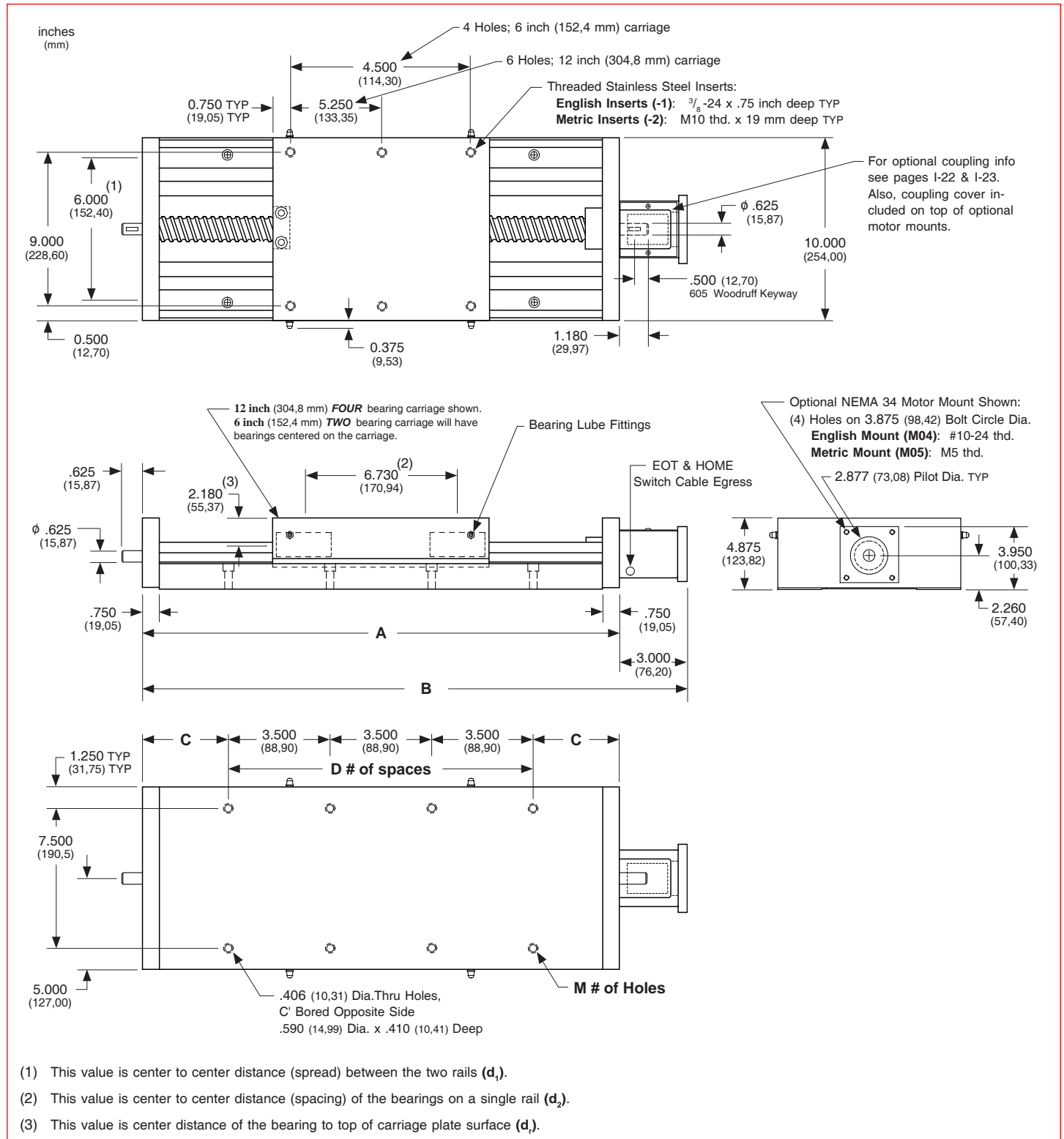
- └ 06 = 6 inch (152,4 mm) carriage length; 2 bearings; carriage weight = 14.0 lbs. (6,35 kg)
- └ 12 = 12 inch (304,8 mm) carriage length; 4 bearings; carriage weight = 26.0 lbs. (11,79 kg)

Footnotes:

(1) Weight shown is with a 1.000 inch (25 mm) diameter screw, a NEMA 34 motor mount [0.54 lbs (0,24 kg)], and a C125 style [0.22 lbs (0,10 kg)] coupling.

Dimensions

- Without Waycovers -



Note: Any 250 series table can be mounted on top of any second 250 series, in order to create X-Y multiple axis configurations. The carriage's threaded stainless steel insert hole pattern DOES NOT exactly match the base mounting hole pattern on each table, therefore machining of the bottom axis carriage plate is required. Contact *LINTECH*.

Dimensions & Specifications

- With Waycovers -

Model Number	Travel Length inches (mm)	Table Dimensions inches (mm)		Mounting Dimensions inches (mm)			Screw Length inches (mm)	Table Weight ⁽¹⁾ lbs (kg)
		A	B	C	D	M		
250606-WC1	6 (150)	15.25 (387,3)	18.25 (463,5)	2.370 (60,2)	3	8	17.05 (433)	54.0 (24,5)
250612-WC1	12 (300)	22.12 (561,8)	25.12 (638,0)	2.310 (58,7)	5	12	23.92 (608)	69.0 (31,3)
250618-WC1	18 (455)	29.25 (742,9)	32.25 (819,1)	2.370 (60,2)	7	16	31.05 (789)	85.0 (38,6)
250624-WC1	24 (605)	36.12 (917,4)	39.12 (993,6)	2.310 (58,7)	9	20	37.92 (963)	101.0 (45,8)
250630-WC1	30 (760)	43.12 (1095,2)	46.12 (1171,4)	2.310 (58,7)	11	24	44.92 (1141)	117.0 (53,1)
250636-WC1	36 (910)	50.12 (1273,0)	53.12 (1349,2)	2.310 (58,7)	13	28	51.93 (1319)	133.0 (60,3)
250648-WC1	48 (1215)	64.00 (1625,6)	67.00 (1701,8)	2.250 (57,1)	17	36	65.80 (1671)	164.0 (74,4)
251206-WC1	6 (150)	21.25 (539,7)	24.25 (615,9)	1.870 (47,5)	5	12	23.05 (585)	79.0 (35,8)
251212-WC1	12 (300)	28.12 (714,2)	31.12 (790,4)	1.810 (46,0)	7	16	29.93 (760)	95.0 (43,1)
251218-WC1	18 (455)	35.25 (895,3)	38.25 (971,5)	1.870 (47,5)	9	20	37.05 (941)	111.0 (50,3)
251224-WC1	24 (605)	42.12 (1069,8)	45.12 (1146,0)	1.810 (46,0)	11	24	43.92 (1116)	127.0 (57,6)
251230-WC1	30 (760)	49.12 (1247,6)	52.12 (1323,8)	1.810 (46,0)	13	28	50.92 (1293)	143.0 (64,9)
251236-WC1	36 (910)	56.12 (1425,4)	59.12 (1501,6)	1.810 (46,0)	15	32	57.92 (1471)	158.0 (71,7)
251248-WC1	48 (1215)	70.00 (1778,0)	73.00 (1854,2)	1.750 (44,4)	19	40	71.80 (1824)	190.0 (86,2)

- └ 06 = 6 inch (152,4 mm) carriage length; 2 bearings; carriage weight = 14.0 lbs. (6,35 kg)
- └ 12 = 12 inch (304,8 mm) carriage length; 4 bearings; carriage weight = 26.0 lbs. (11,79 kg)

Footnotes:

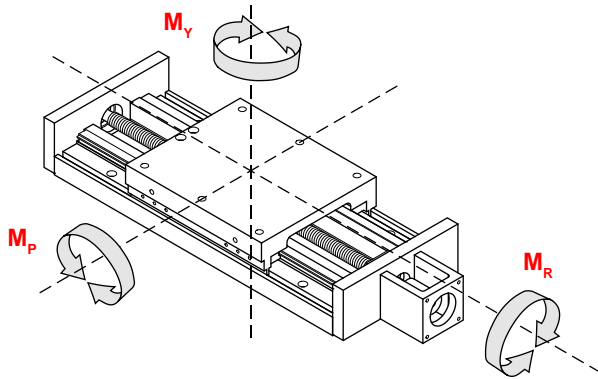
(1) Weight shown is with a 1.000 inch (25 mm) diameter screw, a NEMA 34 motor mount [0.54 lbs (0,24 kg)], and a C125 style [0.22 lbs (0,10 kg)] coupling.

Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 250 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

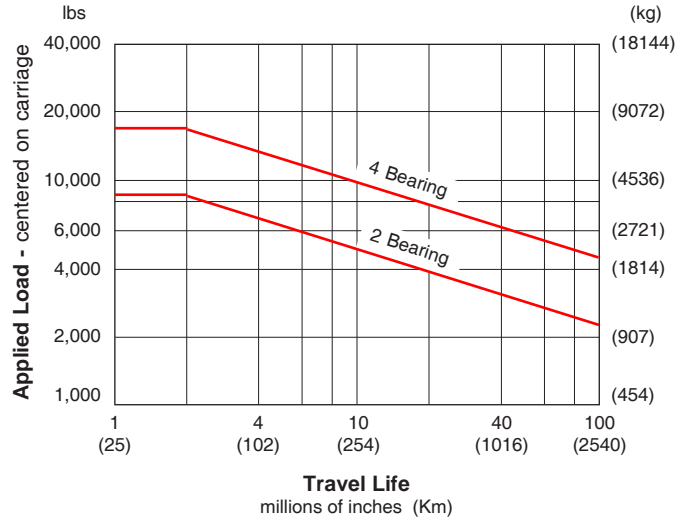
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	lbs	(kg)	lbs	(kg)
2	(50)	8,300	(3765)	16,600	(7530)
50	(1270)	2,830	(1284)	5,660	(2567)
100	(2540)	2,225	(1009)	4,455	(2020)

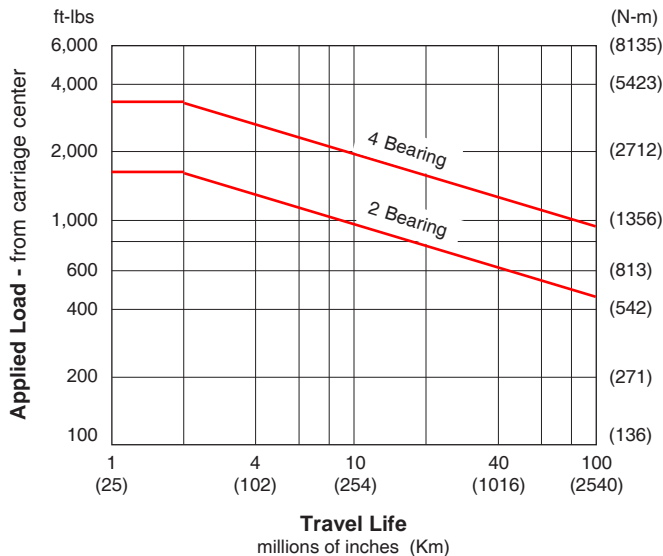


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	1,655	(2244)	3,310	(4488)
50	(1270)	560	(759)	1,130	(1532)
100	(2540)	445	(603)	895	(1213)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

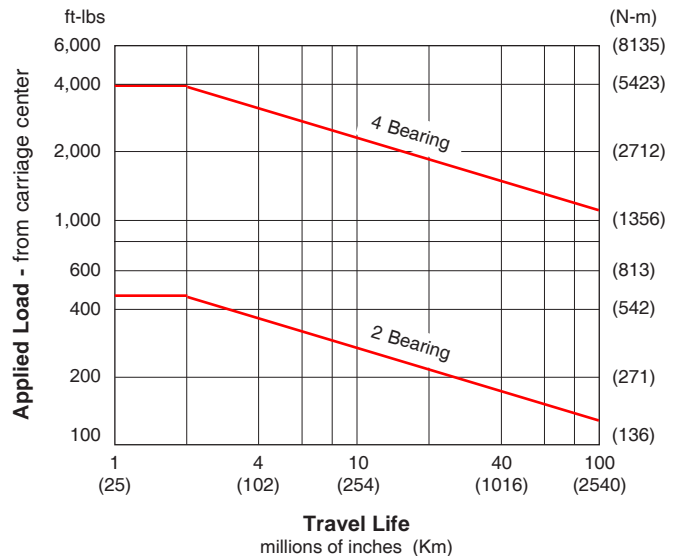


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life		2 Bearing		4 Bearing	
millions of inches	(Km)	ft-lbs	(N-m)	ft-lbs	(N-m)
2	(50)	455	(617)	3,930	(5328)
50	(1270)	154	(209)	1,340	(1817)
100	(2540)	121	(164)	1,065	(1444)

Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)



Screw Travel Life

The life of an acme or ball screw can be estimated by evaluating the load applied to the nut. The applied load "as seen by the screw nut" depends upon the table orientation. Typically, the extra force acting upon the screw nut during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the screw nut at a constant speed is adequate. The life of the screw nut may not be the limiting element for a given application. See page I-12 for load/life capacity of the screw end support bearings.

Horizontal Application

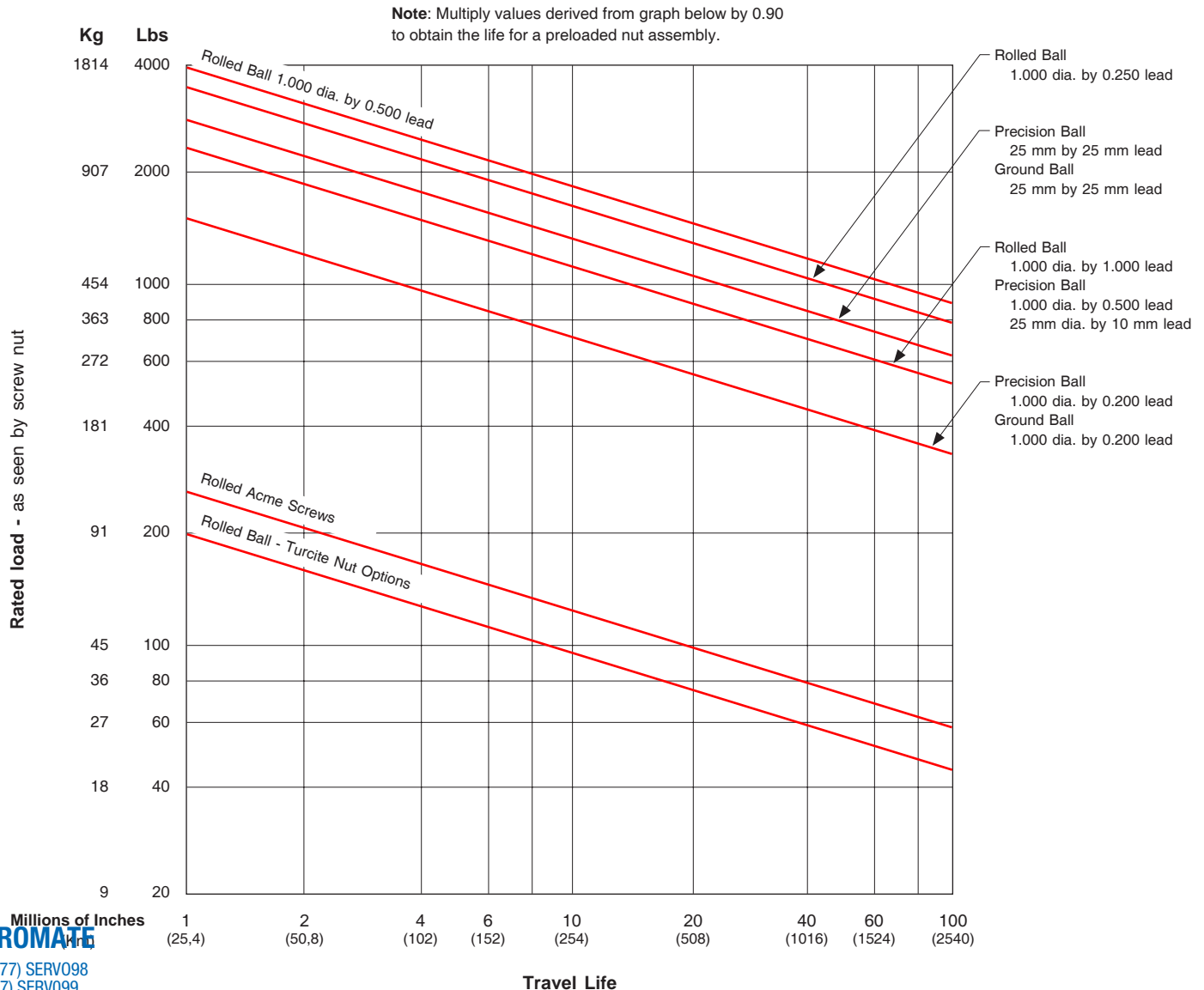
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = either 1 (for millions of inches) or 25 (for Km)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by screw nut*)
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of screw nut at 1 million inches of travel or 25 Km (see pages I-20 & I-21)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)



Thrust Capacity (axial load)

The life of the screw end support bearings can be estimated by evaluating the applied axial (thrust) load. The applied load "as seen by the bearings" depends upon the table orientation. Typically, the extra force acting upon the bearings during the acceleration interval is offset by a reduction in force during the deceleration interval. Therefore, evaluating the life of the bearings at a constant speed is adequate. The life of the screw end support bearings may not be the limiting element for a given application. See page I-11 for load/life capacity of acme and ball screw nuts.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

- B** = 2 (for millions of revolutions)
- E** = externally applied extra forces
- F** = applied axial load (*as seen by the bearings*)
- L** = calculated life (millions of revolutions)
- R** = dynamic load capacity of bearings at 2 million screw revolutions (see below)
- S** = safety factor (1 to 8)
- W** = user mounted load weight to carriage
- μ** = coefficient of friction for linear bearing system (0.01)

Horizontal Application

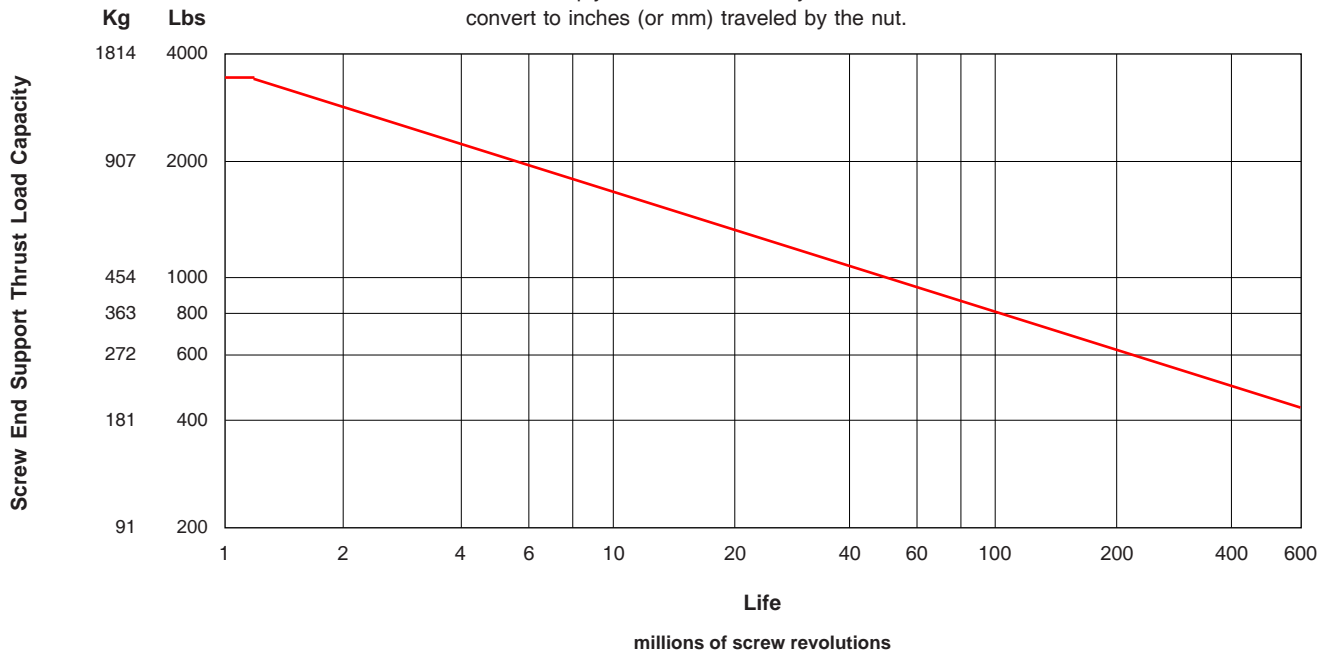
$$F = (W \times \mu) + E$$

Vertical Application

$$F = W + E$$

Screw End Supports		Number of Screw Revolutions millions of screw revolutions						
		Static	1	2	10	50	100	500
Thrust Capacity	lbs (kg)	3,630 (1646)	3,630 (1646)	2,880 (1306)	1,685 (764)	990 (449)	795 (360)	455 (206)

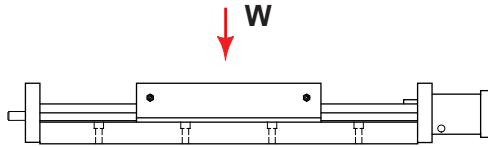
Note: Multiply screw revolutions by the screw lead in order to convert to inches (or mm) traveled by the nut.



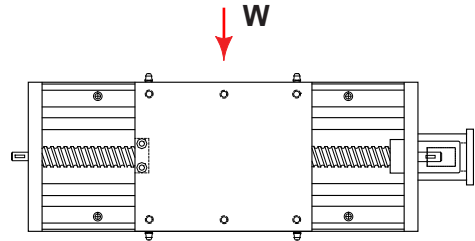
Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$I = 3.81 \text{ in}^4 \text{ (} 15.86 \times 10^5 \text{ mm}^4\text{)}$

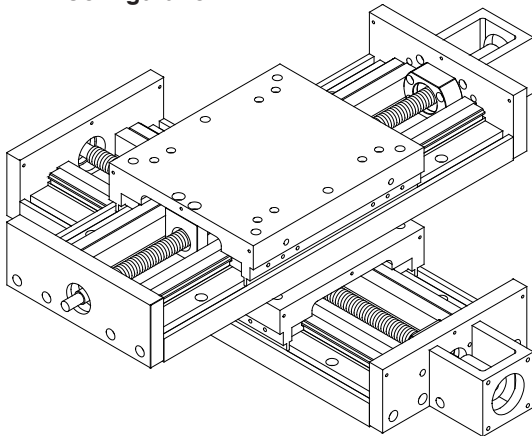
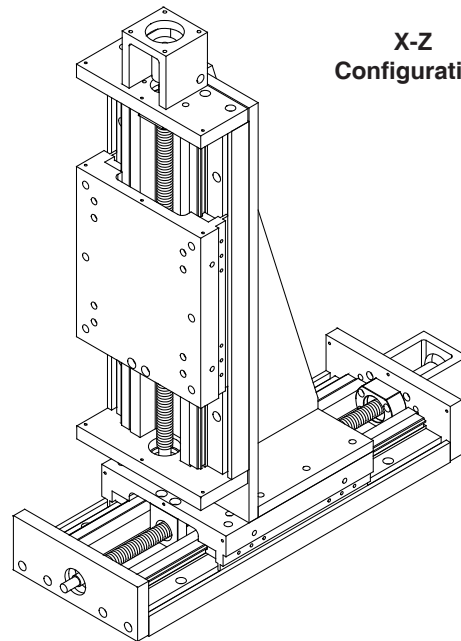
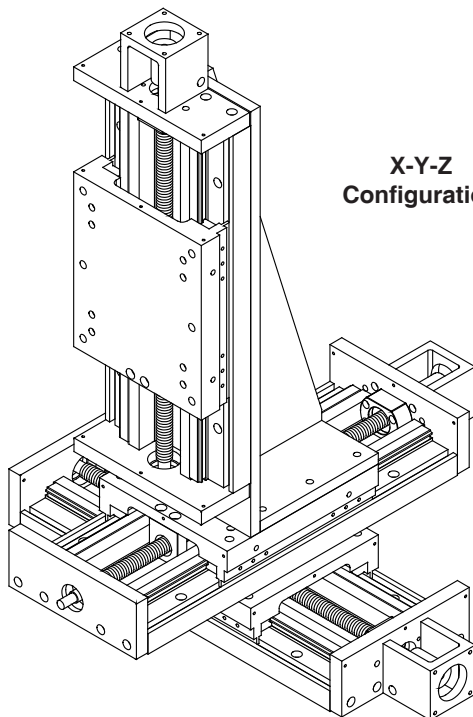


$I = 144.1 \text{ in}^4 \text{ (} 599.9 \times 10^5 \text{ mm}^4\text{)}$



Multi-Axis Configurations

LINTECH can provide various adapter plates, and vertical adapter brackets, to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations. There are literally hundreds of different possible configurations available. See below for some of the more common systems. *LINTECH* has a great deal of experience in dealing with multiple axis configurations. Sometimes different standard table series can be mounted together to form a custom system. Other times, a complete custom assembly is created, due to the application details. Contact *LINTECH* for more information.

X-Y
ConfigurationX-Z
ConfigurationX-Y-Z
Configuration

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Specifications subject to change without notice

End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. One style uses mechanically actuated switches, while other styles use "non-contact" versions. When ordered with a *LINTECH* 250 series table, each switch is mounted to the base of the table, while the actuating cams are mounted to the carriage assembly. Each switch is mounted to a plate that allows for a 0.625 inch (16 mm) adjustment range. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

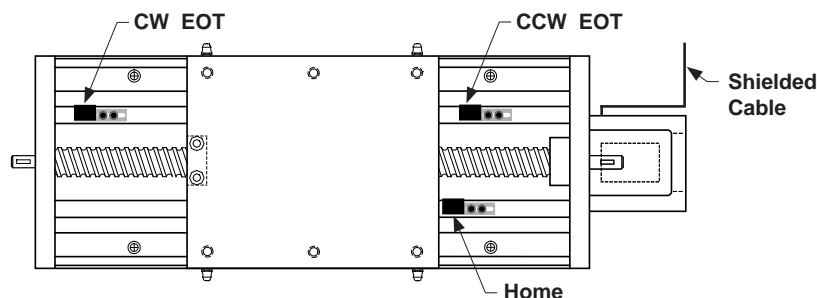
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located on the opposite side of the EOT switches, at the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



Note: For the 250-WC0 series, EOT switches are normally located 0.125 inches (3 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 0.25 inches (6 mm) from listed table travel for each model #. For the 250-WC1 series there is NO reduction of listed travel length when using EOT switches.

Note: Each switch bracket has a 0.625 inch (16 mm) adjustment range

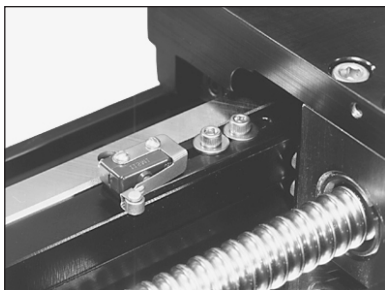
Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
mechanical	least expensive	+/- 0.0002 (5)	mechanical	No	1.75 (44,45)	for most applications
reed	slightly more	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH's* ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

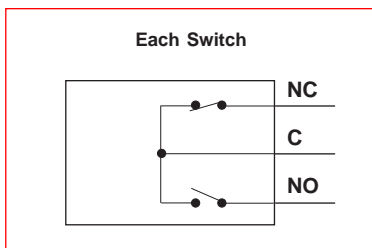
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End of Travel (EOT) Switches & Home Switch

Mechanical Switches

Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 amps @ 125 VAC 1 amp @ 85 VDC
Activation Style	: mechanical cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 85° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: none



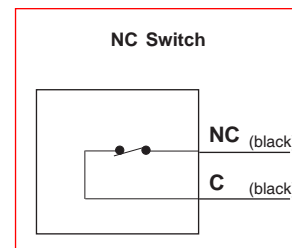
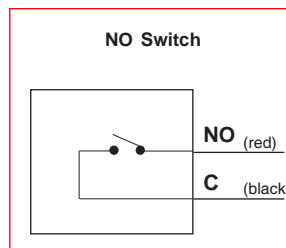
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT	NC
Blue	CW Common	
Red	CCW EOT	NC
White	CCW Common	
Brown	HOME	NO
Green	HOME Common	
Silver	Shield	

Note: Hermetically sealed mechanical switches can be ordered as an option. This may be desired for "wash down" applications. Contact *LINTECH*.

Non-Contact Reed Switches

Repeatability	: +/- 0.0020 inch (50 microns)
Electrical	: 1.0 amps @ 125 VAC 0.5 amps @ 100 VDC
Activation Style	: magnetic
Activation Area	: 0.30 inches (7,62 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: non wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
underterminated leads

Wire Color	Description	
Black	CW EOT (black)	NC
Blue	CW Common (black)	
Red	CCW EOT (black)	NC
White	CCW Common (black)	
Brown	HOME (red)	NO
Green	HOME Common (black)	
Silver	Shield	

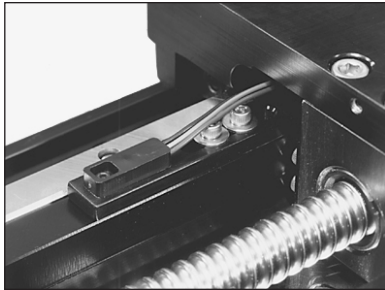
CW - Clockwise
CCW - Counter Clockwise
EOT - End of Travel
NC - Normally Closed
NO - Normally Open

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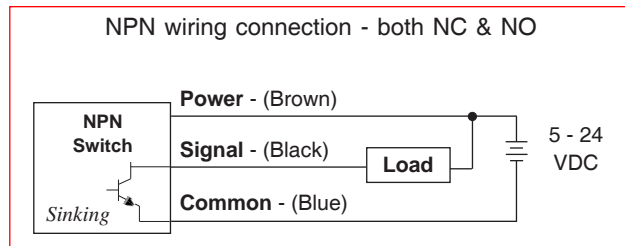
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End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



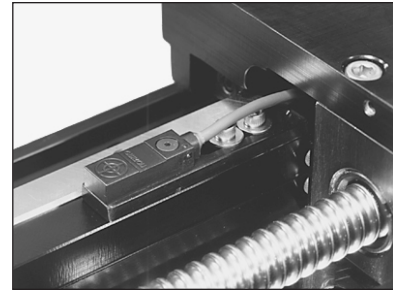
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 - 24 VDC 15 mA - power input 25 mA max - signal
Actuation Style	: magnetic
Activation Area	: 0.32 inches (8,13 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: wash down
Added Table Width	: none
Individual Switch Wiring	: 12 inch (305 mm) leads



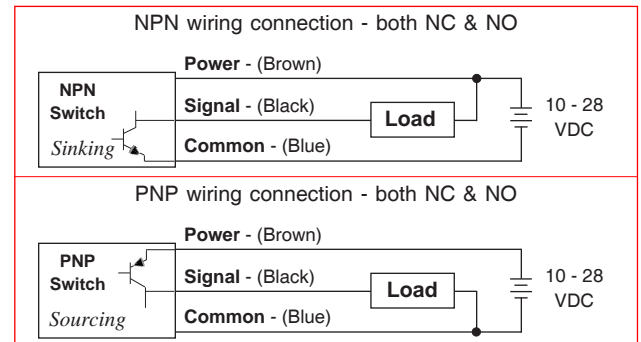
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is
ordered with any table) 10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 10 - 28 VDC 15 mA - power input 100 mA max - signal
Actuation Style	: non-magnetic cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 75° C
Environment	: IEC IP67 wash down
Added Table Width	: none
Individual Switch Wiring	: 6.5 foot (2 m) cable for NPN 3.3 foot (1 m) cable for PNP



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is
ordered with any table) 10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Screws - Acme & Ball

Acme screws use a turcite (polymer), or bronze nut. The nut threads ride in the matching acme screw threads, much like the ordinary nut and bolt system. This produces a higher friction (lower efficiency) system than a ball screw assembly, since there are no rolling elements between the nut and the acme screw threads. For applications requiring low speeds, noise and duty cycles, an acme screw works fine. Also, an acme screw is a good choice for most vertical applications, as it typically prevents back driving of the attached load.

Ball screws are the screw of choice for high duty cycle, high speed, and long life applications. The 250 series tables can be fitted with an assortment of ball screws. The ball screw nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw grooves, providing an efficient low friction system. Using a higher lead

ball screw (for example a 0.500 inch lead instead of a 0.200 inch lead) will offer greater carriage speed for applications requiring rapid traverse, or fast, short incremental moves. Low wear and long life are key features of a ball screw system.

LINTECH provides three different ball screw configurations. The rolled ball screw system utilizes a tapped nut with a standard accuracy grade rolled screw. The precision ball screw system utilizes a ground nut with a higher accuracy grade rolled screw. The ground ball screw system utilizes a ground nut with a high accuracy precision ground screw.

Some screws are available with preloaded nuts. The preloaded nut assembly offers high *bidirectional* repeatability by eliminating backlash.

Consideration	Acme Screw	Ball Screws			Comments
		Rolled	Precision	Ground	
Audible noise	least audible noise	most audible noise	less audible noise than rolled screw	less audible noise than precision screw	Acme: no rolling elements provide for quiet operation. Ball: recirculating balls in nut assembly transmit audible noise during motion; due to more accurate machining procedures - precision & ground ball screws are quieter than rolled ball screws.
Back Driving Loads	may prevent back driving	can easily back drive a load	can easily back drive a load	can easily back drive a load	Acme: good for light loads & vertical applications. Ball: recirculating balls in nut assembly produce a low friction system; vertical applications may require a brake to hold the load when no power is applied to the motor.
Backlash non-preloaded nut	will increase with wear	constant	constant	constant	Acme: preloaded nut assembly eliminates backlash. Ball: preloaded nut assembly eliminates backlash.
Duty Cycle	low to medium (< 50 %)	high (100 %)	high (100 %)	high (100 %)	Acme: low duty cycle due to high sliding friction. Ball: high duty cycle due to recirculating balls in nut assembly; high efficiency & low friction system.
Life	shorter due to higher friction	long	long	long	Acme: mechanical wear related to duty cycle, load & speed. Ball: minimal wear if operated in proper environment, within load specifications, and periodically lubricated.
Relative - Cost	slightly more than rolled ball	least expensive	slightly more than rolled ball	most expensive	Acme: a little more expensive than the rolled ball screw. Ball: due to more accurate manufacturing procedures precision rolled & ground ball screws are more expensive.
Screw Efficiency	low 40 % -Acme 60 % -Turcite	high (90 %)	high (90 %)	high (90 %)	Acme: low efficiency due to high sliding friction. Ball: high efficiency due to recirculating balls in nut assembly - low friction system.
Smoothness	can be smooth	least smooth	medium smoothness	smoothest	Acme: due to friction can start/stop at very low speeds. Ball: smoothness is constant through a wide speed range; due to more accurate manufacturing procedures precision rolled & ground ball screws are smoother than rolled ball screws.
Speeds	low	high	high	high	Acme: high friction can causes excess heat & wear at high speeds. Ball: recirculating balls in nut provide for a high speed system due to low friction & high efficiency.

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Screws - Acme & Ball

250-WC0 series		250-WC1 series		Maximum Safe Table Operating Speed ⁽¹⁾ in/sec (mm/sec)						
Model Number	Travel Length in (mm)	Model Number	Travel Length in (mm)	Screw						
				1.000 dia. 0.100 lead	1.000 dia. 0.200 lead	1.000 dia. 0.250 lead	1.000 dia. 0.500 lead	1.000 dia. 1.000 lead	25 mm dia. 10 mm lead	25 mm dia. 25 mm lead
250607	7.5 (190)	250606	6 (150)	5.0 (127)	10.0 (254)	12.5 (317)	25.0 (635)	50.0 (1270)	22.6 (574)	49.2 (1250)
250614	14.5 (365)	250612	12 (300)	5.0 (127)	10.0 (254)	12.5 (317)	25.0 (635)	50.0 (1270)	22.6 (574)	49.2 (1250)
250621	21.5 (545)	250618	18 (455)	5.0 (127)	10.0 (254)	12.5 (317)	25.0 (635)	50.0 (1270)	22.6 (574)	49.2 (1250)
250628	28.5 (720)	250624	24 (605)	4.4 (112)	8.9 (226)	11.1 (282)	22.2 (564)	44.5 (1130)	17.2 (437)	43.0 (1092)
250635	35.5 (900)	250630	30 (760)	3.1 (79)	6.2 (157)	7.8 (198)	15.6 (396)	31.2 (792)	12.1 (307)	30.2 (767)
250641	42.5 (1075)	250636	36 (910)	2.3 (58)	4.6 (117)	5.8 (147)	11.5 (292)	23.1 (587)	8.9 (226)	22.4 (569)
250655	56.0 (1420)	250648	48 (1215)	1.4 (36)	2.8 (71)	3.5 (89)	7.1 (180)	14.2 (361)	5.5 (140)	13.7 (348)
251207	7.5 (190)	251206	6 (150)	5.0 (127)	10.0 (254)	12.5 (317)	25.0 (635)	50.0 (1270)	22.6 (574)	49.2 (1250)
251214	14.5 (365)	251212	12 (300)	5.0 (127)	10.0 (254)	12.5 (317)	25.0 (635)	50.0 (1270)	22.6 (574)	49.2 (1250)
251221	21.5 (545)	251218	18 (455)	4.7 (119)	9.3 (236)	11.7 (297)	23.4 (594)	46.7 (1186)	18.1 (460)	45.2 (1148)
251228	28.5 (720)	251224	24 (605)	3.3 (84)	6.5 (165)	8.2 (208)	16.4 (417)	32.7 (831)	12.7 (323)	31.7 (805)
251235	35.5 (900)	251230	30 (760)	2.4 (61)	4.8 (122)	6.0 (152)	12.0 (305)	24.1 (612)	9.3 (236)	23.2 (589)
251242	42.5 (1075)	251236	36 (910)	1.8 (46)	3.7 (94)	4.6 (117)	9.2 (234)	18.4 (467)	7.1 (180)	17.8 (452)
251256	56.0 (1420)	251248	48 (1215)	1.2 (30)	2.4 (61)	3.0 (76)	5.9 (150)	11.8 (300)	4.6 (117)	11.5 (292)

Footnotes:

- (1) These listed speeds are a mechanical limitation. The maximum speed of a positioning table depends on the screw diameter, screw lead, screw length, and the screw end bearing support configuration. *LINTECH* uses a fixed-simple screw end bearing support configuration in its positioning tables. The correct motor & drive system needs to be selected in order to obtain the above maximum table speeds.

Screws - Acme & Ball

SCREW	ROLLED BALL SCREWS							
	Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)	Bidirectional Repeatability inches (microns)
1.000 inch dia. 0.250 inch lead	<i>Non-preloaded</i> (S021)	3,350 (1519)	30,750 (13947)	90	25 (0,18)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S022)	3,015 (1367)	30,415 (13796)		40 (0,28)			0
	<i>Non-preloaded</i> Turcite Nut (S023)	195 (88)	1,500 (680)	60	35 (0,25)	< 0.009 (229)	+/- 0.0002 (5)	+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S024)	175 (79)	1,500 (680)		60 (0,42)			0
1.000 inch dia. 0.5000 inch lead	<i>Non-preloaded</i> (S025)	3,950 (1791)	32,300 (14650)	90	30 (0,21)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S026)	3,555 (1612)	31,905 (14471)		50 (0,35)			0
	<i>Non-preloaded</i> Turcite Nut (S027)	195 (88)	1,500 (680)	60	45 (0,32)	< 0.009 (229)	+/- 0.0002 (5)	+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S028)	175 (79)	1,500 (680)		80 (0,56)			0
1.000 inch dia. 1.000 inch lead	<i>Non-preloaded</i> (S029)	2,250 (1020)	13,750 (6236)	90	35 (0,25)	< 0.009 (229)		+ 0.0002 to - 0.0092 (5) (234)
	⁽²⁾ <i>Preloaded</i> (S030)	2,025 (918)	13,525 (6134)		60 (0,42)			0
	<i>Non-preloaded</i> Turcite Nut (S031)	195 (88)	1,500 (680)	60	50 (0,35)	< 0.009 (229)	+/- 0.0002 (5)	+ 0.0002 to - 0.0092 (5) (234)
	<i>Preloaded</i> Turcite Nut (S032)	175 (79)	1,500 (680)		90 (0,64)			0

Footnotes:

- (1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).
- (2) There is a 1.4 inch (35,6 mm) reduction of carriage travel (from the listed travel) when using a preloaded nut with this screw option for all the 250-WC0 (6 inch carriage) model versions. All the 12 inch carriage model numbers and the 250-WC1 series are not affected.

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Screws - Acme & Ball

SCREW		PRECISION BALL SCREWS							Bidirectional Repeatability inches (microns)	
		Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)		
1.000 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S130)	1,420 (644)	4,600 (2086)	90	20 (0,14)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 (5)	to - 0.0032 (81)
	<i>Preloaded</i> (S131)	1,275 (578)	4,140 (1878)		30 (0,21)		0		+ 0.0002 (5)	- 0.0002 (5)
25 mm dia. 10 mm lead	<i>Non-preloaded</i> (S132)	2,305 (1045)	6,250 (2835)	90	25 (0,18)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 (5)	to - 0.0032 (81)
	<i>Preloaded</i> (S133)	2,075 (941)	5,625 (2551)		40 (0,28)		0		+ 0.0002 (5)	- 0.0002 (5)
25 mm dia. 25 mm lead	<i>Non-preloaded</i> (S134)	2,785 (1263)	7,550 (3425)	90	35 (0,25)	< 0.002 (50)	< 0.003 (76)	+/- 0.0002 (5)	+ 0.0002 (5)	to - 0.0032 (81)
	<i>Preloaded</i> (S135)	2,506 (1,137)	6,795 (3082)		60 (0,42)		0		+ 0.0002 (5)	- 0.0002 (5)

SCREW		GROUND BALL SCREWS							Bidirectional Repeatability inches (microns)	
		Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)		
1.000 dia., 0.200 lead <i>Preloaded</i> (S218)		1,420 (644)	4,600 (2086)	90	30 (0,21)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 (2,5)	to - 0.0001 (2,5)
1.000 dia., 0.500 lead <i>Preloaded</i> (S219)		2,470 (1120)	6,695 (3037)	90	40 (0,28)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 (2,5)	to - 0.0001 (2,5)
25 mm dia., 25 mm lead <i>Preloaded</i> (S220)		2,785 (1263)	7,550 (3425)	90	50 (0,35)	< 0.0006 (15)	0	+/- 0.0001 (2,5)	+ 0.0001 (2,5)	to - 0.0001 (2,5)

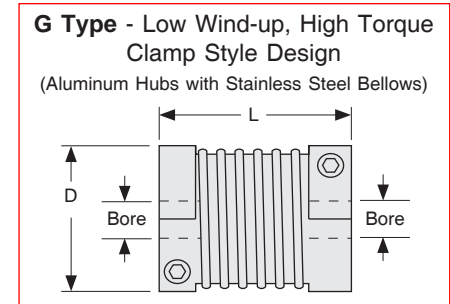
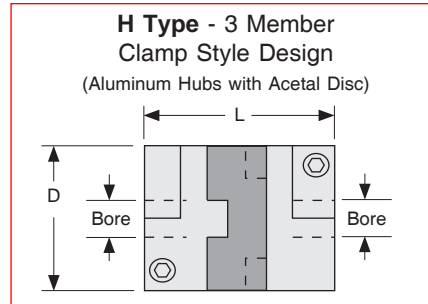
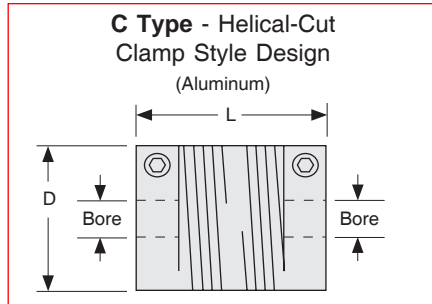
SCREW		ROLLED ACME SCREWS							Bidirectional Repeatability inches (microns)	
		Dyn. ⁽¹⁾ Capacity lbs (kg)	Static Capacity lbs (kg)	Screw Efficiency %	Breakaway Torque oz-in (N-m)	Position Accuracy inch/ft (microns/300 mm)	Backlash inches (microns)	Unidirectional Repeatability inches (microns)		
1.000 inch dia. 0.100 inch lead	<i>Non-preloaded</i> (S310)	250 (113)	1,250 (567)	40	20 (0,14)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 (5)	to - 0.0082 (208)
	<i>Preloaded</i> (S311)	225 (102)	1,125 (510)		40 (0,28)		0		+ 0.0002 (5)	- 0.0002 (5)
1.000 inch dia. 0.200 inch lead	<i>Non-preloaded</i> (S312)	250 (113)	1,250 (567)	40	30 (0,21)	< 0.003 (75)	< 0.008 (203)	+/- 0.0002 (5)	+ 0.0002 (5)	to - 0.0082 (208)
	<i>Preloaded</i> (S313)	225 (102)	1,125 (510)		60 (0,42)		0		+ 0.0002 (5)	- 0.0002 (5)

Footnotes:

(1) Dynamic load capacity of screw based on 1 million inches of travel (25Km).

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & screw shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model (1) Number	D inches (mm)	L inches (mm)	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
			Table	Motor	Minimum (in) (mm)	Maximum (in) (mm)				
C125-625-aaa	1.25 (31,8)	2.00 (50,8)	625	aaa	.250 6	.500 14	3.5 (99)	.68 (124)	15.0 (0,59)	700 (4,9)
C150-625-aaa	1.50 (38,1)	2.37 (60,2)	625	aaa	.375 10	.625 16	5.5 (156)	1.54 (282)	13.0 (0,51)	950 (6,7)
H131-625-aaa	1.31 (33,3)	1.89 (48,0)	625	aaa	.250 6	.625 16	2.9 (82)	.62 (114)	2.5 (0,098)	1,000 (7,1)
H163-625-aaa	1.63 (41,4)	2.00 (50,8)	625	aaa	.375 10	.750 20	5.4 (153)	1.79 (328)	1.2 (0,047)	2,000 (14,1)
G126-625-aaa	1.26 (32,1)	1.62 (41,0)	625	aaa	.250 6	.625 16	2.7 (74)	.54 (99)	0.3 (0,012)	1,100 (7,7)
G158-625-aaa	1.58 (40,2)	1.85 (47,0)	625	aaa	.375 10	.750 20	4.3 (120)	1.34 (245)	0.2 (0,008)	2,400 (17,0)
Possible values for aaa	250 = .250 inch 375 = .375 inch 500 = .500 inch 625 = .625 inch		750 = .750 inch		005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm		012 = 12 mm 014 = 14 mm 016 = 16 mm 018 = 18 mm		019 = 19 mm 020 = 20 mm	

Footnotes:

- (1) See page I-23 for maximum coupling diameter and length specifications for use with the optional NEMA 34 and 42 motor mounts. Custom motor mounts can be provided upon request.

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Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
C Type	least expensive	light	the most	stepper	ideal for most step motor applications
H Type	medium priced	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	most expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

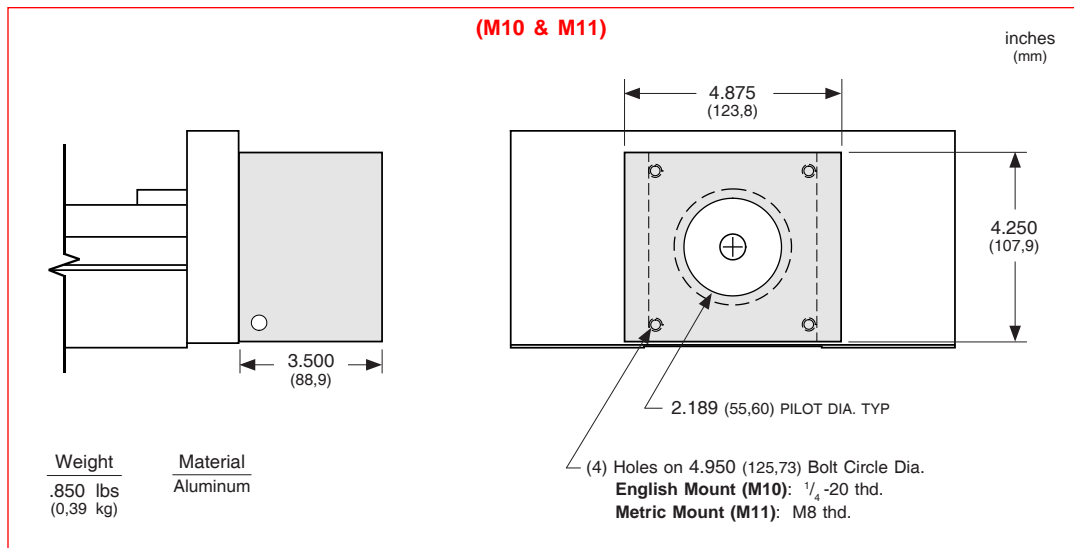
Specification	250 Series NEMA 34 bracket	250 Series NEMA 42 bracket
	inches (mm)	inches (mm)
Shaft extension diameter at motor mount end	0.625 (15,9)	0.625 (15,9)
Maximum coupling diameter	2.000 (50,8)	2.000 (50,8)
Maximum coupling length	2.500 (63,5)	2.500 (63,5)
Note: Custom brackets available upon request.		

Coupling Part Numbers

C064 C125-625-375	C175 H131-625-375	C455 G126-625-375
C065 C125-625-500	C176 H131-625-500	C456 G126-625-500
C066 C125-625-010	C177 H131-625-625	C457 G126-625-625
C067 C125-625-012	C178 H131-625-008	C458 G126-625-008
C068 C125-625-014	C179 H131-625-010	C459 G126-625-010
	C180 H131-625-012	C460 G126-625-012
C091 C150-625-375	C181 H131-625-014	C461 G126-625-014
C092 C150-625-500	C182 H131-625-016	C462 G126-625-016
C093 C150-625-625		
C094 C150-625-010	C212 H163-625-375	C492 G158-625-375
C095 C150-625-012	C213 H163-625-500	C493 G158-625-500
C096 C150-625-014	C214 H163-625-625	C494 G158-625-625
C097 C150-625-016	C215 H163-625-750	C495 G158-625-750
	C216 H163-625-010	C496 G158-625-010
	C217 H163-625-012	C497 G158-625-012
	C218 H163-625-014	C498 G158-625-014
	C219 H163-625-016	C499 G158-625-016
	C220 H163-625-018	C500 G158-625-018
	C221 H163-625-019	C501 G158-625-019
	C222 H163-625-020	C502 G158-625-020

NEMA 42 Motor Mount

The NEMA 42 motor adapter bracket is an aluminum bracket that mounts to the 250 series tables. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.

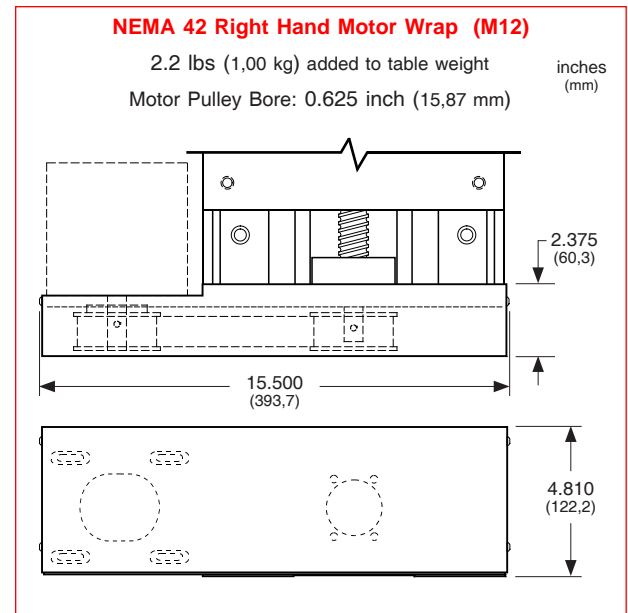
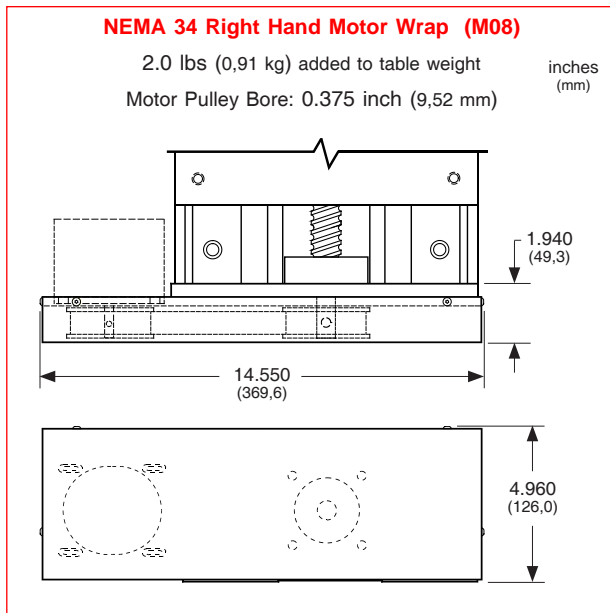


Chrome Plated Linear Bearings, Rails, and Screws

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, linear rails, and the screw will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails or screw, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail, or screw. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

Motor Wrap Packages

For space limited 250 series applications, a belt and pulley system can couple the screw shaft extension to the motor shaft. This wraps the motor parallel to the table in order to decrease the overall positioning system length. Pulley weights and diameters are given in order to assist in calculating motor torque requirements.



Motor Wrap Frame Size	Motor Pulley Dia. inches (mm)	Motor Pulley Wt. ounces (kg)	Screw Pulley Dia. inches (mm)	Screw Pulley Wt. ounces (kg)	Belt Weight ounces (kg)
NEMA 34	1.65 (41,9)	8.0 (0,23)	1.65 (41,9)	8.0 (0,23)	1.2 (0,034)
NEMA 42	2.12 (53,9)	19.2 (0,54)	2.12 (53,9)	19.2 (0,54)	3.0 (0,085)

Note: Right hand motor wraps shown. The left hand wrap packages orient the motor to the opposite side of the table. Motor pulley & belt shipped "loose". No motor mount nuts & bolts are provided. Custom motor wrap packages are available upon request. Other motor pulley bores MUST be specified for non-NEMA motors.

Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 250 series will have the brake mounted to the screw shaft extension located on the table end, opposite the motor mount bracket. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the positioning table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

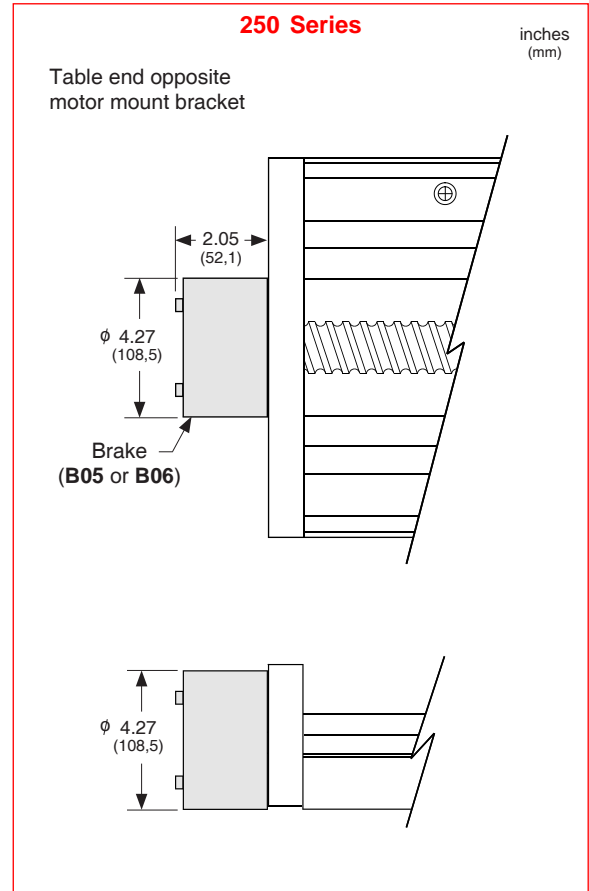
Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B05	180 (20,3)	24 VDC	1.136	4.5 (2,04)
B06	180 (20,3)	90 VDC	0.287	4.5 (2,04)

Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60



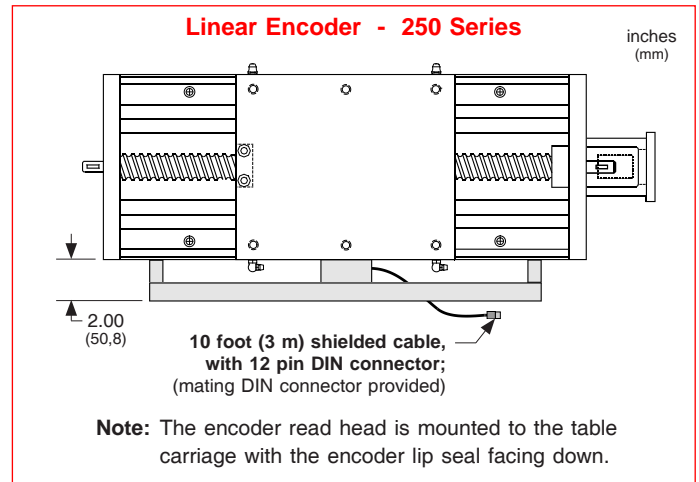
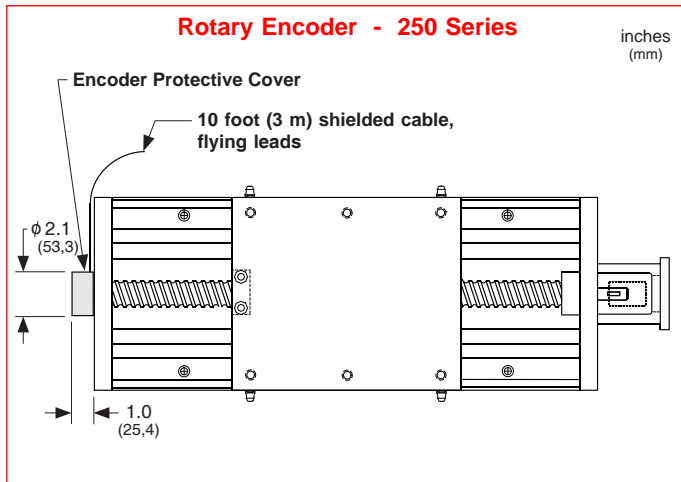
Linear & Rotary Incremental Encoders

Fully enclosed, incremental, optical linear encoders can be mounted along side any *LINTECH* 250 series table. Shaftless, incremental, optical rotary encoders can be mounted to the screw shaft extension opposite the motor mount end on the 250 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.

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LINEAR		ROTARY	Description
Din Pin #	Wire Color	Wire Color	
C	Green	White	Channel A ⁺ (or A)
D	Yellow	Blue	Channel A ⁻ (or \bar{A})
E	Pink	Green	Channel B ⁺ (or B)
L	Red	Orange	Channel B ⁻ (or \bar{B})
G	Brown	White/Black	Channel Z ⁺ (or Z)
H	Grey	Red/Black	Channel Z ⁻ (or \bar{Z})
A	Shield		Case ground
B	White	Black	Common
K	Black	Red	+ 5 vdc (+/- 5%)



Specification	ROTARY ENCODERS			LINEAR ENCODERS	
	E01	E02	E03	E10	E11
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev	2500 lines/inch	125 lines/mm
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse	0.0004 inch/pulse	8 microns/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0.00025 revs/pulse	0.00019 revs/pulse	0.0001 inch/pulse	2 micron/pulse
Accuracy				+/- 0.0002 in/40"	+/- 5 microns/m
Maximum Speed	50 revs/sec			79 inches/sec	2 m/sec
Maximum Accel	40 revs/sec ²			130 ft/sec ²	40 m/sec ²
Excitation Power	+ 5 VDC @ 125 ma			+ 5 VDC @ 150 ma	
Operating Temperature	32° F to 140° F (0° C to 60° C)			32° F to 120° F (0° C to 50° C)	
Humidity	20% to 80% non condensing			20% to 80% non condensing	
Shock	10 G's for 11 msec duration			15 G's for 8 msec duration	
Weight	0.7 lbs (0,283 kg)			0.7 oz/inch (0,00078 kg/mm) length of scale + 0.5 lbs (0,23 kg) read head and brackets	
Cable Length	10 ft (3 m), unterminated 26 gauge leads			10 ft (3 m) with DIN connector	
Zero Reference Output	Once per revolution			At center of encoder length	
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver				

Notes

Sold & Serviced By:



Toll Free Phone (877) SERV098

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www.electromate.com

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Specifications Subject to Change Without Notice

550 Series Positioning Tables



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Single or Multiple Axis

LINTECH's 550 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- *Welding*
- *Test Stands*
- *Part Insertion*
- *Laser Positioning*
- *Liquid Dispensing*
- *Semiconductor Processing*
- *Gluing*
- *Pick & Place*
- *Part Scanning*
- *Inspection Stations*
- *General Automation*

Quality Construction

LINTECH's 550 series tables are designed to handle large loads at very high speeds. These tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on a single precision ground linear rail. The single linear rail is mounted to a precision machined aluminum base, which offers a rigid support over the entire travel of the table's carriage. The load is mounted to a precision machined aluminum carriage, which has slots machined into it. These slots, along with the base mounting brackets, are used for the mounting of the user load. The drive system uses two pulleys, along with a high strength, steel reinforced polyurethane belt, which provides 8.071 inches (205 mm) of linear movement per revolution of the input shaft. The simple belt tensioning system allows for easy adjustment of belt tension by the user. The belt also acts as a cover, preventing debris from getting into the linear bearings & rail.

The 553 carriage uses 2 high load capacity linear bearings on one precision ground square rail. Both bearings are connected to an internal lubrication network. Any of the 4 lube ports, located on the carriage surface, can be used to supply lubrication to the 2 linear bearings.

The 554 carriage uses 2 high load capacity linear bearings on one precision ground square rail. Both bearings are out-fitted with a self-lubricating material which eliminates the need for regular lubrication. No lube ports are provided on the carriage surface.

The 555 carriage uses 2 high load capacity linear bearings on one precision ground square rail. A unique ball retainer design for the recirculating linear bearings provides a smoother operating system with less audible noise. Both bearings are connected to an internal lubrication network. Any of the 4 lube ports, located on the carriage surface, can be used to supply lubrication to the 2 linear bearings.

Available Options

Carriage Adapter Plates & Vertical Angle Brackets

Optional carriage adapter plates and vertical angle brackets can be mounted directly to the top of various *LINTECH* positioning tables, thus providing for easy multiple axis configurations.

End of Travel and Home Switches

The 550 series tables can be provided with end of travel (EOT) and home switches mounted and wired for each axis. Most position controllers can utilize the EOT switches to stop carriage motion when the extreme table travel has been reached in either direction. The home switch provides a known mechanical location on the table.

Motor Adapter Brackets

NEMA 34, NEMA 42, or any metric mount motor can be mounted to a 550 series positioning table with the use of adapter brackets.

Rotary Encoders

Incremental rotary encoders can be mounted to the table in order to provide positional data back to either a motion controller, or a digital display.

Planetary Gearheads

LINTECH provides planetary gearheads which can be used with a 550 series. These gearheads are provided in either an in-line or right angle version, with standard gear ratios of 1:1, 3:1, 5:1 or 10:1. Gearheads may be required for applications which have a large mismatch of load to motor inertias. They also help reduce the torque required from the motor for a particular application.

Other

The 550 series tables can accommodate **chrome plated linear bearings & rails** for corrosive environment applications and **power-off electric brakes** for load locking applications.

Standard Features - 550 Series

- ❑ 10.236 inches (260 mm) long carriage with two M5 slots for load mounting
- ❑ Compact 3.15 inches (80 mm) wide by 3.937 inches (100 mm) tall
- ❑ Travel lengths from 12 inches (300 mm) to 30 feet (9,1 meters)
- ❑ Rigid belt driven design with fully enclosed aluminum housing
- ❑ 0° F to +176° F (-18° C to +80° C) operating temperature
- ❑ Two screw belt tensioning with self locking threads
- ❑ Dynamic Load Capacity to 10,500 lbs (4763 kg)
- ❑ Recirculating linear ball bearing system
- ❑ Precision ground square rail design
- ❑ 1 rail with 2 bearing carriages

550 Series (553 Carriage)



- ❑ Two bearing carriage
- ❑ 10,500 lbs (4763 kg) dynamic load capacity
- ❑ 410 ft-lbs (556 N-m) dynamic roll moment
- ❑ Less expensive than the 555 carriage
- ❑ Large moment load capability

550 Series (554 Carriage)



- ❑ Two bearing carriage
- ❑ 10,500 lbs (4763 kg) dynamic load capacity
- ❑ 410 ft-lbs (556 N-m) dynamic roll moment
- ❑ Self lubricating linear bearings
- ❑ Large moment load capability

550 Series (555 Carriage)



- ❑ Two bearing carriage
- ❑ 9,120 lbs (4136 kg) dynamic load capacity
- ❑ 172 ft-lbs (233 N-m) dynamic roll moment
- ❑ Less audible noise than the 553 or 554 series
- ❑ Smoother than the 553 or 554 carriage
- ❑ Unique linear bearing design

Options - 550 Series

- ❑ Angle brackets for multiple axis configurations
- ❑ End of travel (EOT) and home switches wired
- ❑ CAD drawings available via the internet
- ❑ Chrome plated linear bearings and rails
- ❑ Motor mounts for non-NEMA motors
- ❑ NEMA 34 & 42 motor mounts
- ❑ Rotary incremental encoders
- ❑ Power-off electric brakes
- ❑ Base mounting brackets
- ❑ Carriage adapter plates
- ❑ Planetary gearheads
- ❑ Motor couplings

553 **10** **012** - **D1** - **M04** - **C293** - **L04** - **E00** - **B00**

Table Series

- 553** - 553 carriage
- 554** - 554 carriage
- 555** - 555 carriage

Carriage Length

- 10** - 10 inches

Travel Length (see page K-6)

- 012** - 12 to 360 inches

Drive Shaft (see page K-7)

- D1** - Right Hand single shaft **D3** - Right Hand thru shaft
- D2** - Left Hand single shaft **D4** - Left Hand thru shaft

Motor Mount (see page K-20)

- M00** - none; just shaft extension **M04** - NEMA 34 mount (E) **M10** - NEMA 42 mount (E)
- M99** - other **M05** - NEMA 34 mount (M) **M11** - NEMA 42 mount (M)

Coupling Options (see pages K-24 & K-25)

- C000** - none **C293 to C303** - H197 **C573 to C583** - G177 **C684 to C691** - G260
- C999** - none **C359 to C369** - H225 **C639 to C649** - G220

Limit & Home Switches (see pages K-21 to K-23)

- | | | | | | |
|--------------------------|---------------------|------------|------------|------------|------------|
| L00 - no switches | | Reed | Hall | Prox (NPN) | Prox (PNP) |
| L99 - other | EOT & home switches | L04 | L07 | L10 | L13 |
| | EOT switches only | L05 | L08 | L11 | L14 |
| | home switch only | L06 | L09 | L12 | L15 |

Encoder Options (see page K-27)

- E00** - none **E02** - rotary (1000 lines/rev) **E99** - other
- E01** - rotary (500 lines/rev) **E03** - rotary (1270 lines/rev)

note: When selecting any rotary encoder option, the Drive Shaft D3 or D4 above is required.

Power-off Brakes (see page K-26)

- B00** - none **B05** - 24 VDC **B06** - 90 VDC **B99** - other

note: When selecting any brake option, the Drive Shaft D3 or D4 above is required.

(E) - English Interface
(M) - Metric Interface

Specifications

Load Capacities		553 & 554 Carriages		555 Carriage	
Dynamic Horizontal	2 million inches (50 km) of travel	10,500 lbs	(4763 kg)	9,120 lbs	(4136 kg) ⁽¹⁾
Dynamic Horizontal	50 million inches (1270 km) of travel	3,590 lbs	(1628 kg)	3,119 lbs	(1414 kg) ⁽¹⁾
Static Horizontal		15,400 lbs	(6985 kg)	14,700 lbs	(6668 kg) ⁽¹⁾
Dynamic Roll Moment	2 million inches (50 km) of travel	410 ft-lbs	(556 N-m)	172 ft-lbs	(233 N-m)
Dynamic Roll Moment	50 million inches (1270 km) of travel	140 ft-lbs	(190 N-m)	59 ft-lbs	(80 N-m)
Static Roll Moment		650 ft-lbs	(881 N-m)	285 ft-lbs	(386 N-m)
Dyn. Pitch & Yaw Moment	2 million inches (50 km) of travel	1,215 ft-lbs	(1647 N-m)	510 ft-lbs	(690 N-m)
Dyn. Pitch & Yaw Moment	50 million inches (1270 km) of travel	414 ft-lbs	(561 N-m)	174 ft-lbs	(236 N-m)
Static Pitch & Yaw Moment		1,775 ft-lbs	(2406 N-m)	845 ft-lbs	(1145 N-m)
Each Bearing Dyn. Capacity	2 million inches (50 km) of travel	5,250 lbs	(2381 kg)	4,560 lbs	(2068 kg) ⁽¹⁾
Each Bearing Dyn. Capacity	50 million inches (1270 km) of travel	1,795 lbs	(814 kg)	1,559 lbs	(707 kg) ⁽¹⁾
Each Bearing Static Load Capacity		7,700 lbs	(3493 kg)	7,350 lbs	(3334 kg) ⁽¹⁾
Maximum Belt Tensile Force		675 lbs	(306 kg)	675 lbs	(306 kg)
Maximum Carriage Thrust Force		475 lbs	(215 kg)	475 lbs	(215 kg)
Maximum Speed		118 in/sec	(3 m/sec)	197 in/sec	(5 m/sec)
Maximum Acceleration		1,930 in/sec ²	(49,0 m/sec ²)	1,930 in/sec ²	(49,0 m/sec ²)
d₂	Center to center distance (spacing) of each bearing on a single rail	3.876 in	(98,4 mm)	3.876 in	(98,4 mm)
d_r	Center distance of the bearing to top of carriage plate surface	1.508 in	(38,3 mm)	1.626 in	(41,3 mm)

Other	553, 554 & 555 Carriages
Table Material	Base Extrusion, Carriage, & End Plates - 6061 anodized aluminum
Linear Rail Material	Case Hardened Steel
Belt Properties	Black, 50 mm wide, Polyurethane, Steel reinforced belt
Drive Pulley Weight	1.500 lbs (0,68 kg)
Drive Pulley Diameter	2.569 in (65,25 mm)
Drive Lead	8.071 in (205,00 mm)
Belt Stretch - x Load (lbs or N)	0.00006 in/ft per lbs (0,00114 mm/m per N)
Unidirectional Repeatability	+/- 0.001 in (+/- 0,0254 mm)
Bidirectional Repeatability	+/- 0.004 in (+/- 0,1016 mm)
Position Accuracy (Belt) ⁽²⁾	< 0.010 in/ft (< 0,254 mm/300mm)
Orthogonality (multi-axis systems)	< 60 arc-seconds
Friction Coefficient	< 0.01
Breakaway Torque ⁽³⁾	< 16 lb-in (1,808 N-m)
Motor Mount	NEMA 34 & 42 Mounts, Metric Mounts, and Gearheads
Coupling	Two (2) different styles available

Footnotes:

- (1) Derate value by 50 % when load is applied to the open end of the bearing (inverted configuration).
- (2) Position accuracy varies based on belt stretch. The given rating is based upon a carriage speed of 5 inches/sec (127 mm/sec) and a no load condition.
- (3) This is a nominal value. Breakaway torque will increase, or decrease, based on belt tension.

Dimensions & Specifications

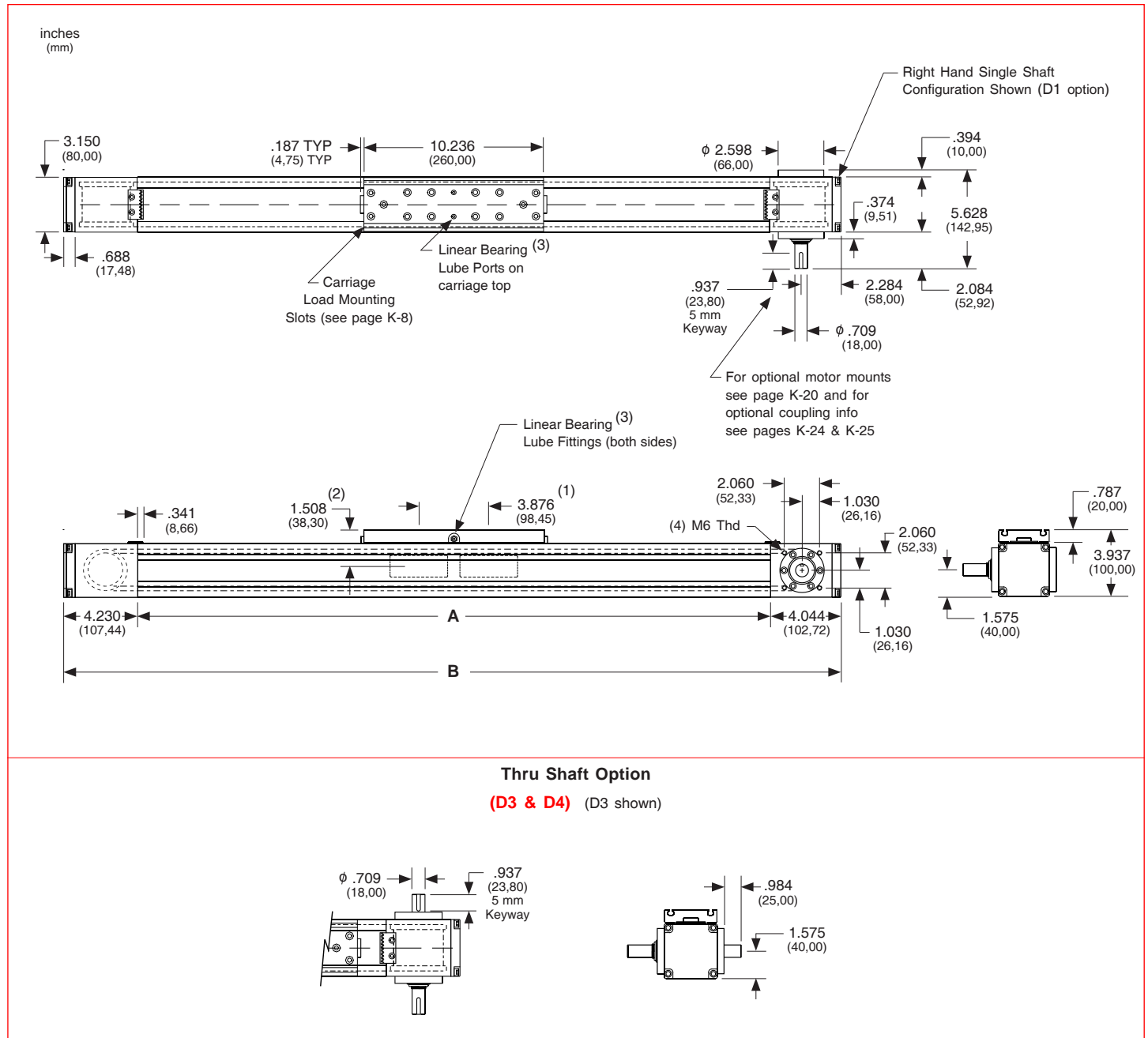
Model Number	Travel ⁽¹⁾ Length inches (mm)	Table Dimensions inches (mm)		Belt Weight lbs (kg)	Table Weight (553 & 554 Carriages) lbs (kg)	Table Weight (555 Carriage) lbs (kg)
		A	B			
55x10012	12 (300)	24.00 (609,6)	32.275 (819,8)	0.29 (0,13)	24.1 (10,9)	23.0 (10,4)
55x10018	18 (455)	30.00 (762,0)	38.275 (972,2)	0.40 (0,18)	27.3 (12,4)	26.0 (11,8)
55x10024	24 (605)	36.00 (914,4)	44.275 (1124,6)	0.51 (0,23)	30.6 (13,9)	29.2 (13,2)
55x10030	30 (760)	42.00 (1066,8)	50.275 (1277,0)	0.62 (0,28)	33.9 (15,4)	32.3 (14,7)
55x10036	36 (910)	48.00 (1219,2)	56.275 (1429,4)	0.72 (0,33)	37.2 (16,9)	35.5 (16,1)
55x10048	48 (1215)	60.00 (1524,0)	68.275 (1734,2)	0.94 (0,43)	43.8 (19,9)	41.8 (19,0)
55x10060	60 (1520)	72.00 (1828,8)	80.275 (2039,0)	1.15 (0,52)	50.3 (22,8)	48.0 (21,8)
55x10072	72 (1825)	84.00 (2133,6)	92.275 (2343,8)	1.37 (0,62)	56.9 (25,8)	54.3 (24,6)
55x10084	84 (2130)	96.00 (2438,4)	104.275 (2648,6)	1.58 (0,72)	63.5 (28,8)	60.6 (27,5)
55x10096	96 (2435)	108.00 (2743,2)	116.275 (2953,4)	1.80 (0,82)	70.1 (31,8)	66.9 (30,3)
55x10108	108 (2740)	120.00 (3048,0)	128.275 (3258,2)	2.01 (0,91)	76.7 (34,8)	73.2 (33,2)
55x10120	120 (3045)	132.00 (3352,8)	140.275 (3563,0)	2.23 (1,01)	83.2 (37,8)	79.4 (36,0)
55x10132	132 (3350)	144.00 (3657,6)	152.275 (3867,8)	2.44 (1,11)	89.8 (40,8)	85.7 (38,9)
55x10144	144 (3655)	156.00 (3962,4)	164.275 (4172,6)	2.66 (1,21)	96.4 (43,7)	92.0 (41,7)
55x10180	180 (4572)	192.00 (4876,8)	200.275 (5087,0)	3.30 (1,50)	116.1 (52,7)	110.8 (50,3)
55x10240	240 (6096)	252.00 (6400,8)	260.275 (6611,0)	4.38 (1,99)	149.0 (67,6)	142.2 (64,5)
55x10300	300 (7620)	312.00 (7924,8)	320.275 (8135,0)	5.45 (2,47)	181.9 (82,5)	173.6 (78,7)
55x10360	360 (9144)	372.00 (9448,8)	380.275 (9659,0)	6.52 (2,96)	214.8 (97,4)	204.9 (92,9)

- x = 3; 553 Carriage; Carriage weight = 7.98 lbs. (3,62 kg)
- x = 4; 554 Carriage; Carriage weight = 7.98 lbs. (3,62 kg)
- x = 5; 555 Carriage; Carriage weight = 7.14 lbs. (3,24 kg)

Footnotes:

(1) Longest possible travel is 30 feet (9,1 meters). Any travel length less than 30 feet (9,1 meters) can be provided.

Dimensions

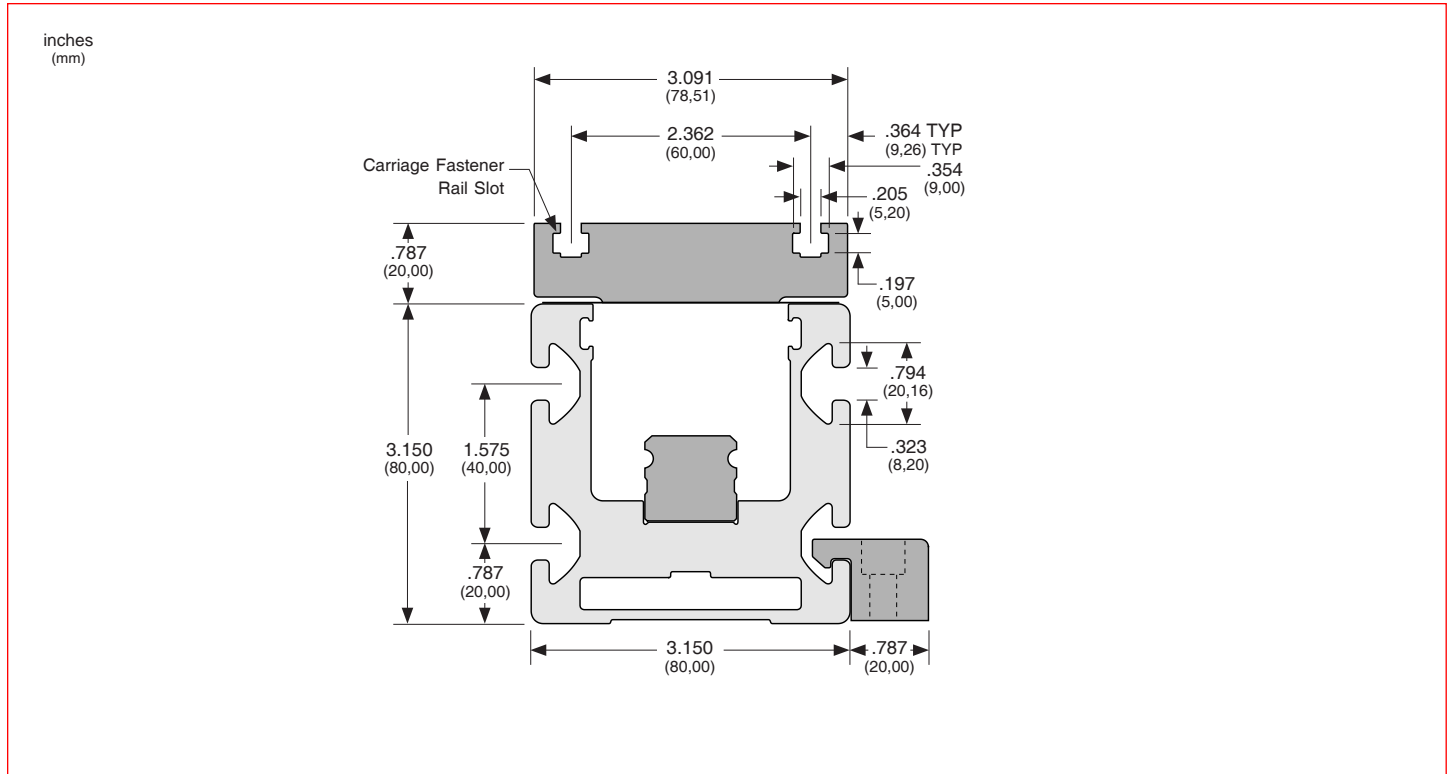


Footnotes:

- (1) This value is center to center distance (spacing) of each bearing on a single rail (d_2).
- (2) This value is the center distance of the bearing to top of carriage plate surface (d_1) for the 553 & 554 carriages. For the 555 carriage $d_1 = 1.626$ inches (41,3 mm).
- (3) Two lube ports on carriage top and lube fittings on each side of the 553 & 555 carriages are all interconnected. Only one port is required to lubricate both linear bearings. The 554 carriage will not have any lube ports.

Carriage Fastener Rail & Base Mounting Brackets

LINTECH provides the user with 2 vital optional accessories. The carriage fastener rails slide into the two slots on the 550 series carriage. These fastener rails give the user the ability to mount their load to the 550 series carriage. From 1 to 3 fastener rails can be used in each carriage slot. The base mounting brackets give the user the ability to mount the 550 series table to a mounting surface. These mounting brackets attach anywhere along the bottom T-slot's on both sides of the 550 series table.

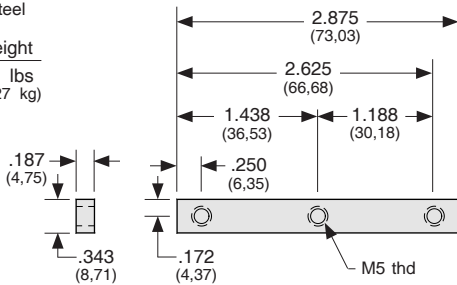


Carriage Fastener Rail
(part # 201174)

Base Mounting Brackets
(part # 46627)

Material
Stainless Steel

Weight
.06 lbs
(0,027 kg)



Weight
.19 lbs
(0,086 kg)

Material
Aluminum

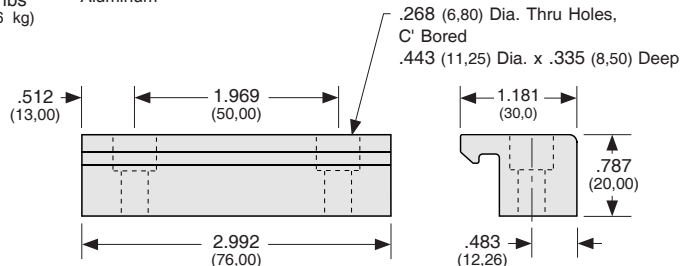
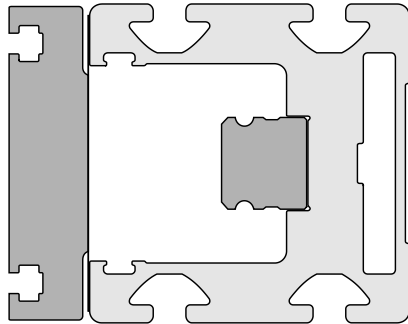


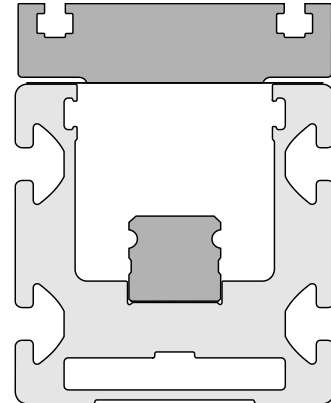
Table Deflection - Moment of Inertia Values

The "moment of inertia" of an object is a gauge of the strength of that object to resist deflecting when used in an application or orientation where deflection might occur. The higher an I value relates to a lower amount of deflection.

$I = 3.10 \text{ in}^4 \text{ (} 1.29 \times 10^6 \text{ mm}^4\text{)}$



$I = 4.44 \text{ in}^4 \text{ (} 1.85 \times 10^6 \text{ mm}^4\text{)}$

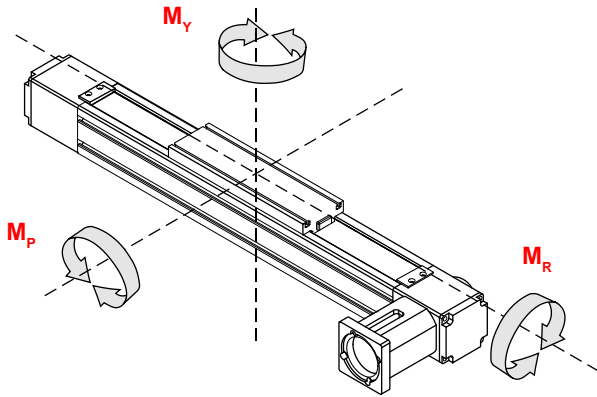


Linear Bearing Load Capacities

The following equation, and graphs, can be used to help determine the linear bearing life, and load capacity, of a 550 series positioning table.

$$L = \left[\frac{R}{F \times S} \right]^3 \times B$$

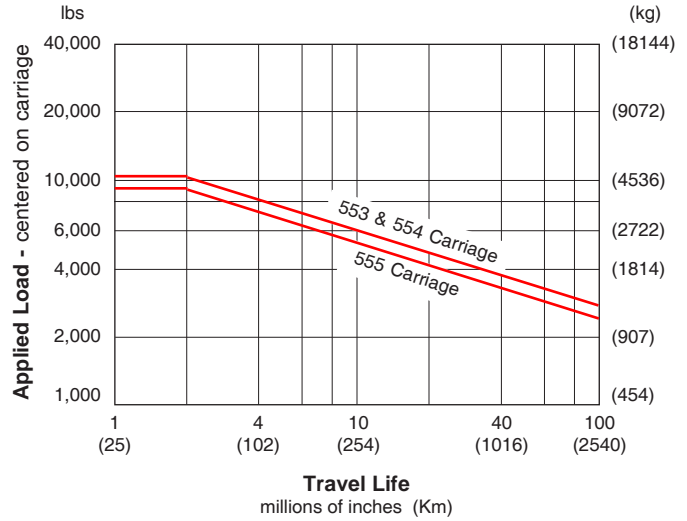
- L** = calculated travel life (millions of inches or Km)
- R** = rated dynamic load capacity of carriage (or each bearing) at 2 million inches of travel or 50 Km
- F** = user applied load
- S** = safety factor (1 to 8)
- B** = either 2 (for millions of inches) or 50 (for Km)



Dynamic Horizontal Load Capacity

Load Centered on Carriage

travel life millions of inches (Km)	553 & 554 Carriage		555 Carriage	
	lbs	(kg)	lbs	(kg)
2	10,500	(4763)	9,120	(4136)
50	3,590	(1628)	3,119	(1414)
100	2,849	(1292)	2,475	(1123)

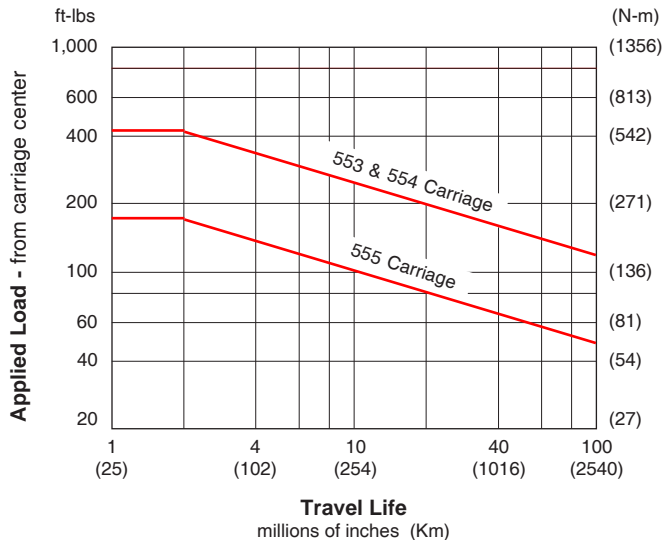


Dynamic Moment Load (M_R) Capacity

Load applied away from Carriage Center

travel life millions of inches (Km)	553 & 554 Carriage		555 Carriage	
	ft-lbs	(N-m)	ft-lbs	(N-m)
2	410	(556)	172	(233)
50	140	(190)	59	(80)
100	111	(150)	47	(64)

Ratings are based on d₃ = 12 inches (305 mm) & d₄ = 0

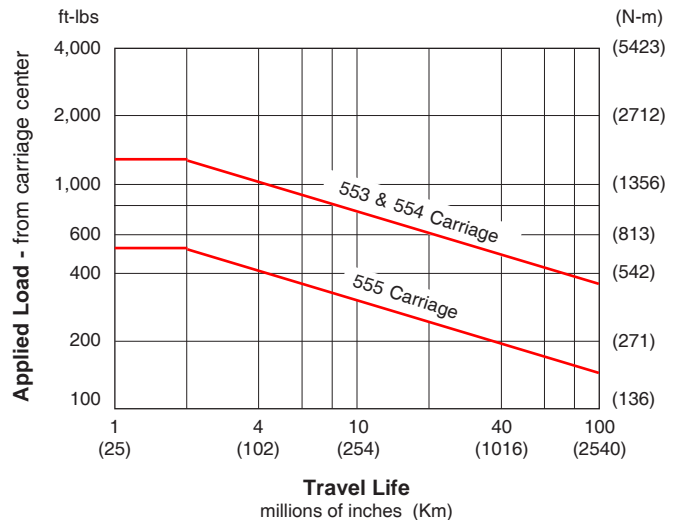


Dynamic Moment Load (M_p & M_y) Capacity

Load applied away from Carriage Center

travel life millions of inches (Km)	553 & 554 Carriage		555 Carriage	
	ft-lbs	(N-m)	ft-lbs	(N-m)
2	1,215	(1647)	510	(690)
50	414	(561)	174	(236)
100	330	(447)	138	(187)

Ratings are based on d₃ = 0 & d₄ = 12 inches (305 mm)



Maximum Motor Input Torque, Maximum Belt Force, & Maximum Acceleration Rate

Maximum Motor Input Torque

The maximum safe speed/torque of a motor/drive system that can be used with the 550 series, is limited by the belt strength at a given speed. The maximum linear forces the belt can adequately handle are determined by the number of teeth on the pulley and the belt width. The chart below illustrates the relationship between motor input torque/belt force and carriage speed. Care should be taken when sizing and selecting a motor/drive system for use with a 550 series table. Exceeding the maximum input torque values at the listed speeds can cause belt "skipping" over pulley teeth. This will result in mis-positioning of the carriage.

Maximum Acceleration

The maximum acceleration rate using a 550 series table can be determined by the simple equation $F = M \times A$. Knowing the mass of the load, and the maximum safe operating force for the belt, the maximum possible acceleration rate can be determined. **Note:** The mechanical limitation for acceleration of the 550 series table is 5 g's.

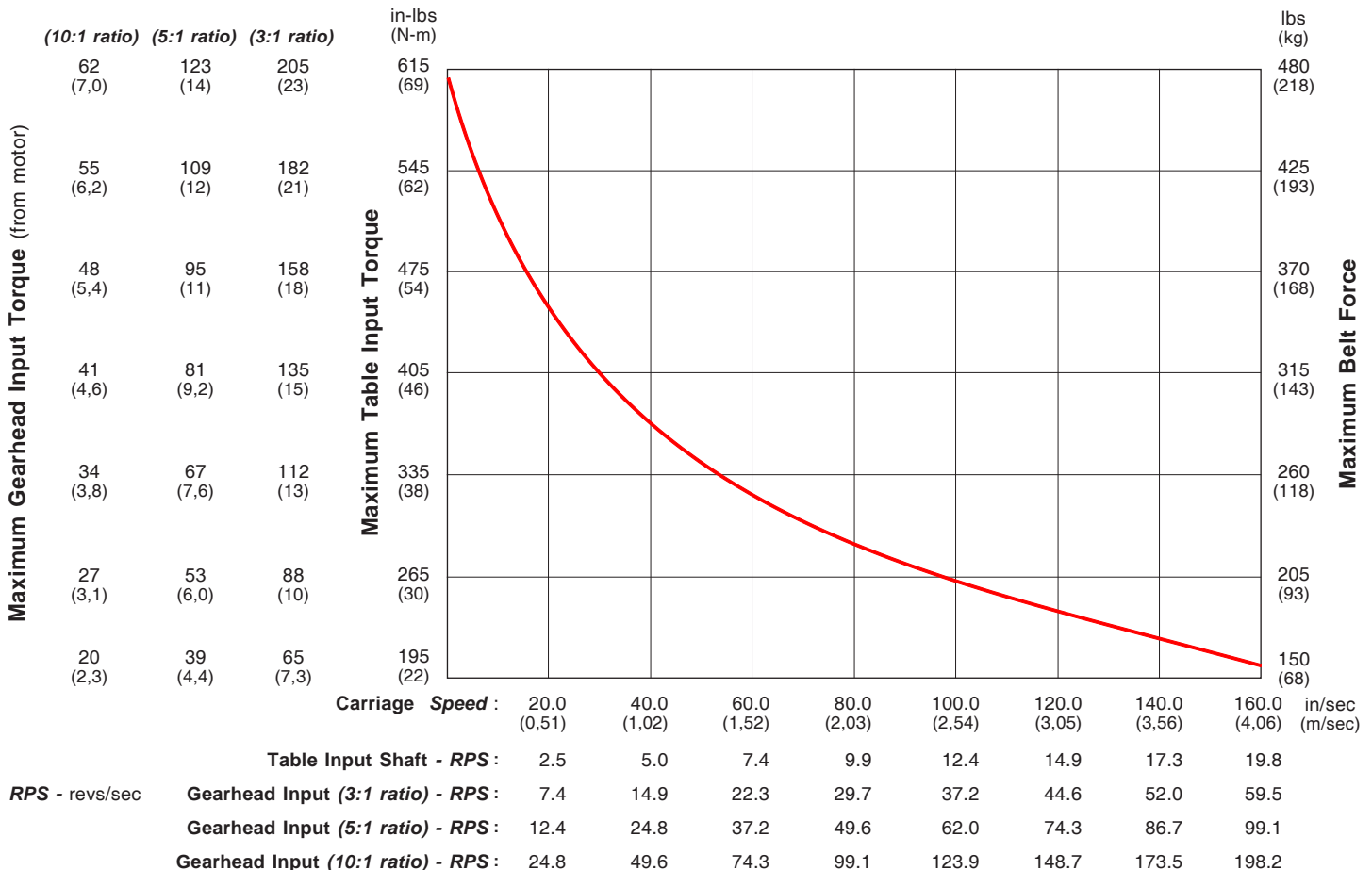
Maximum Acceleration Example

- $F = M \times A$
- F = maximum belt force at desired speed
- M = user applied load
- A = maximum acceleration rate (g's)
- $\text{Sin } \phi$ = angle of table from horizontal (degrees)

<u>Horizontal Application</u>	<u>Vertical Application</u>
$A = \frac{F}{M}$	$A = \frac{F - M \text{ Sin } \phi}{M}$

Example: A 200 lb load is mounted to a 550 series carriage in a horizontal application. Determine the maximum accel rate in g's & in/sec² that can be used to achieve a maximum speed of 75 IPS.

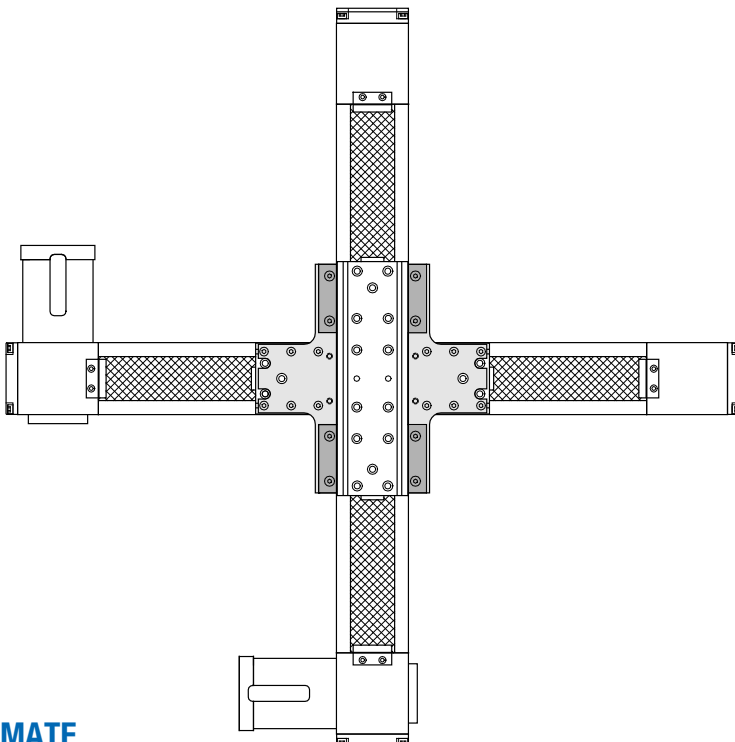
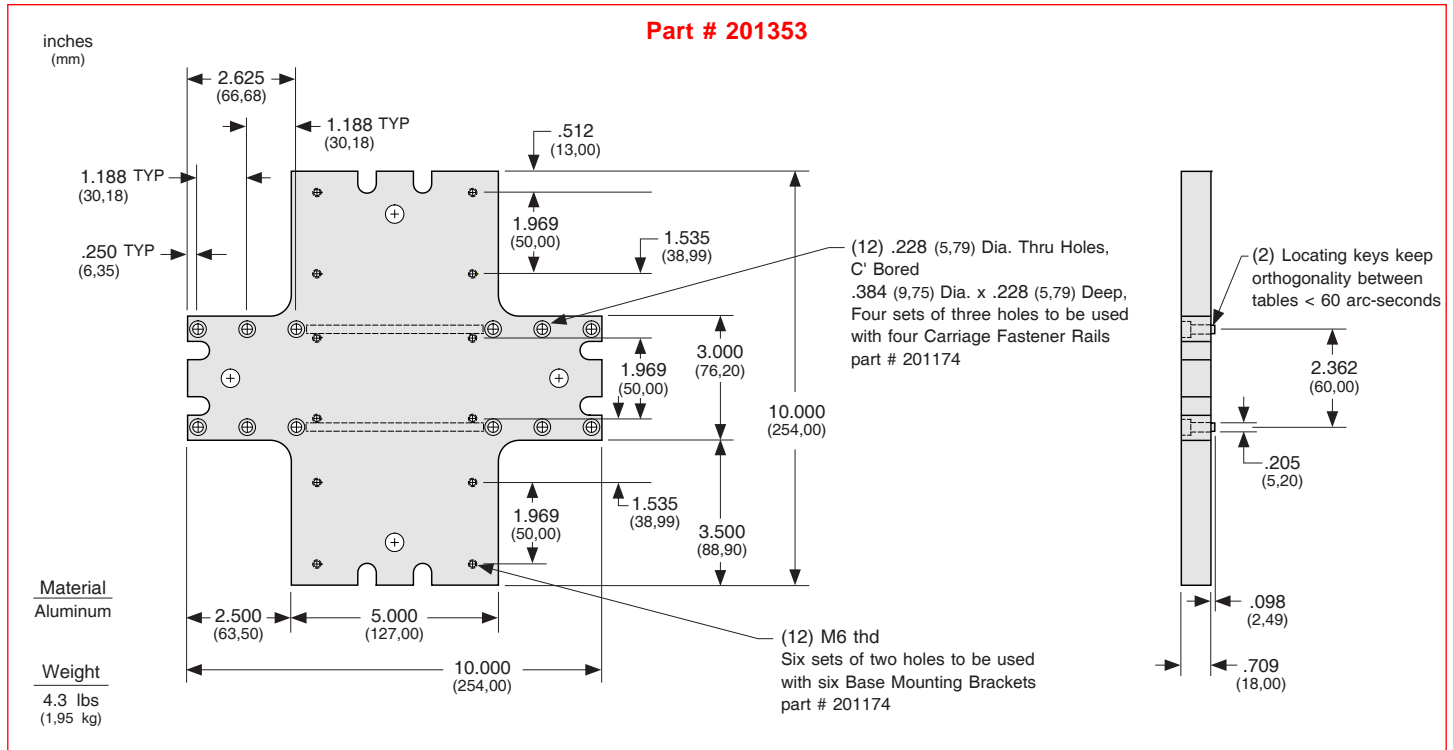
- Step 1:** From graph below, determine the maximum belt force at 75 IPS : ($F = 235$ lbs).
- Step 2:** Add up your total mass = load weight + carriage weight : ($M = 5.4 + 200 = 205.4$ lbs).
- Step 3:** Solve for A : ($A = 235/205.4 = 1.1$ g's).
- Note:** 1 g = 386 in/sec²
- Step 5:** 1.1 g's x 386 = 442 in/sec².



1) Table friction & breakaway forces have already been deducted from the above maximum belt force values.
 2) Curve based upon maximum belt values. Select a motor coupling that can handle the required torque.

Carriage Adapter Plate (550 Base to 550 Carriage)

Optional carriage adapter plates assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. Using one of the adapter plates below, allows a 550 series table to be mounted on top of a second 550 series table in order to make an X-Y axes system (see below). Also, using two of the adapter plates below, allows a 550 series table to be mounted on top of two 550 series tables in order to make an X-Y axes gantry system (see page K-14).



Mounting Hardware Kit Part # 202023

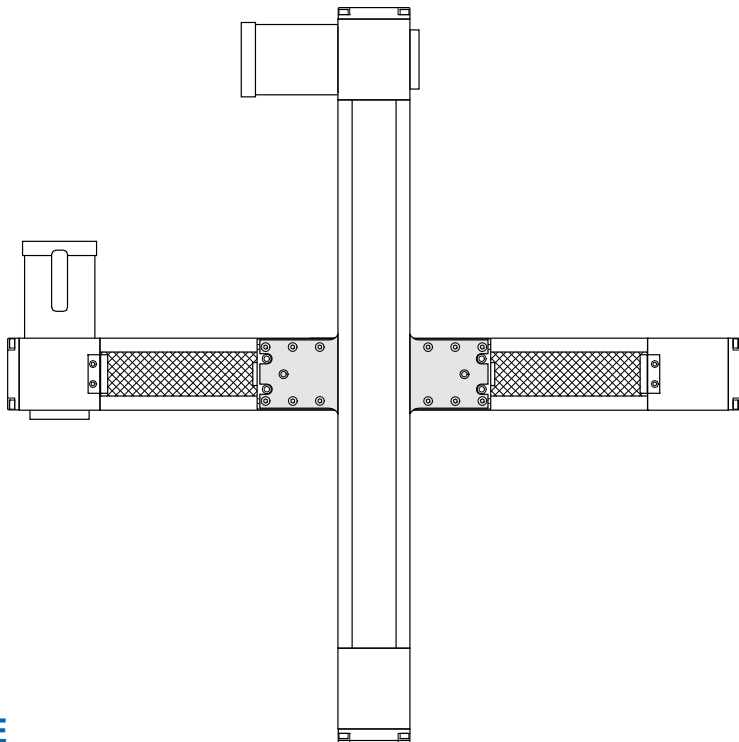
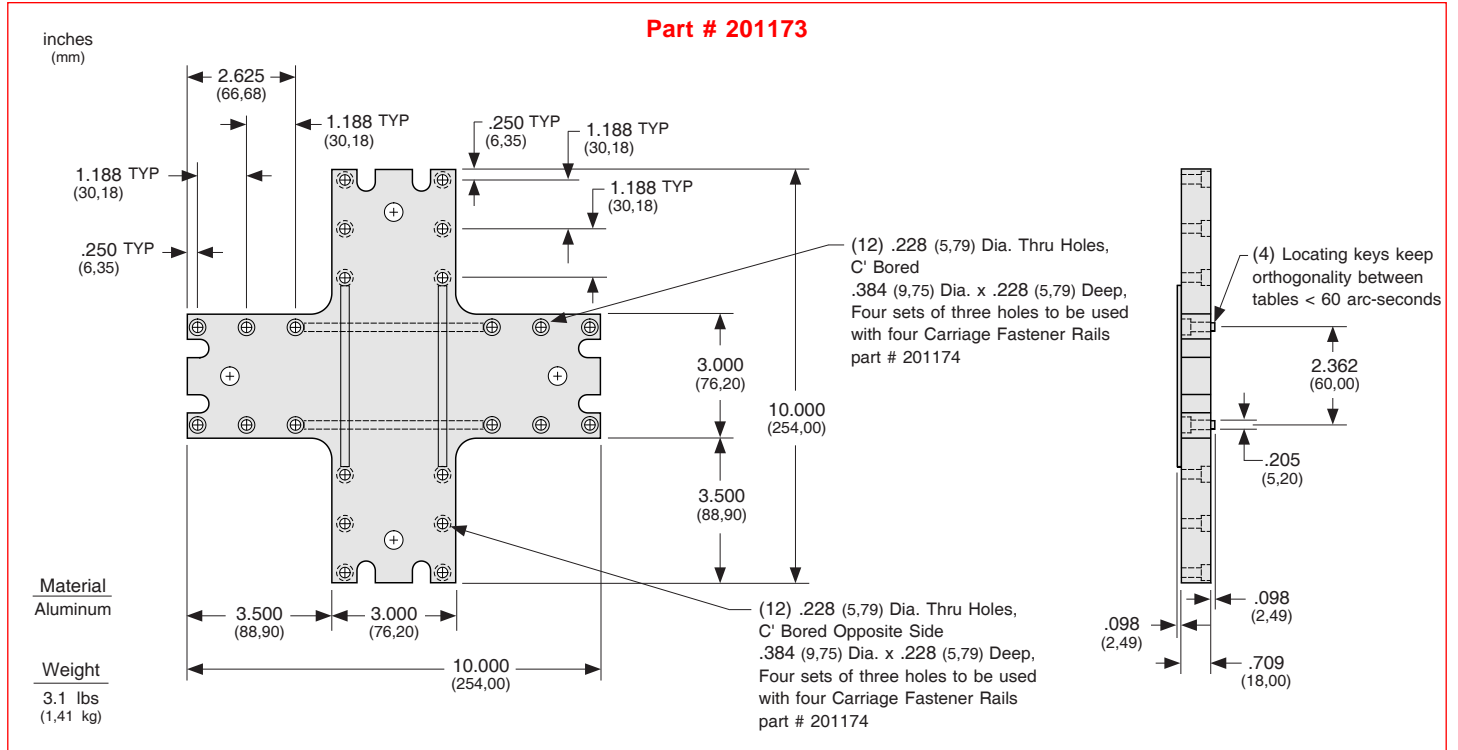
- a) 4 Carriage Fastener Rails
- b) 4 Base Mounting Brackets
- c) 12 M5 x 20 mm Bolts
- d) 8 M6 x 30 mm Bolts

Mounting Hardware Kit Part # 202024

- a) 4 Carriage Fastener Rails
- b) 6 Base Mounting Brackets
- c) 12 M5 x 20 mm Bolts
- d) 12 M6 x 30 mm Bolts

Carriage Adapter Plate (550 Carriage to 550 Carriage)

Optional carriage adapter plates assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. The adapter plate below allows two 550 series tables to be mounted carriage to carriage in order to make an X-Y axes system.

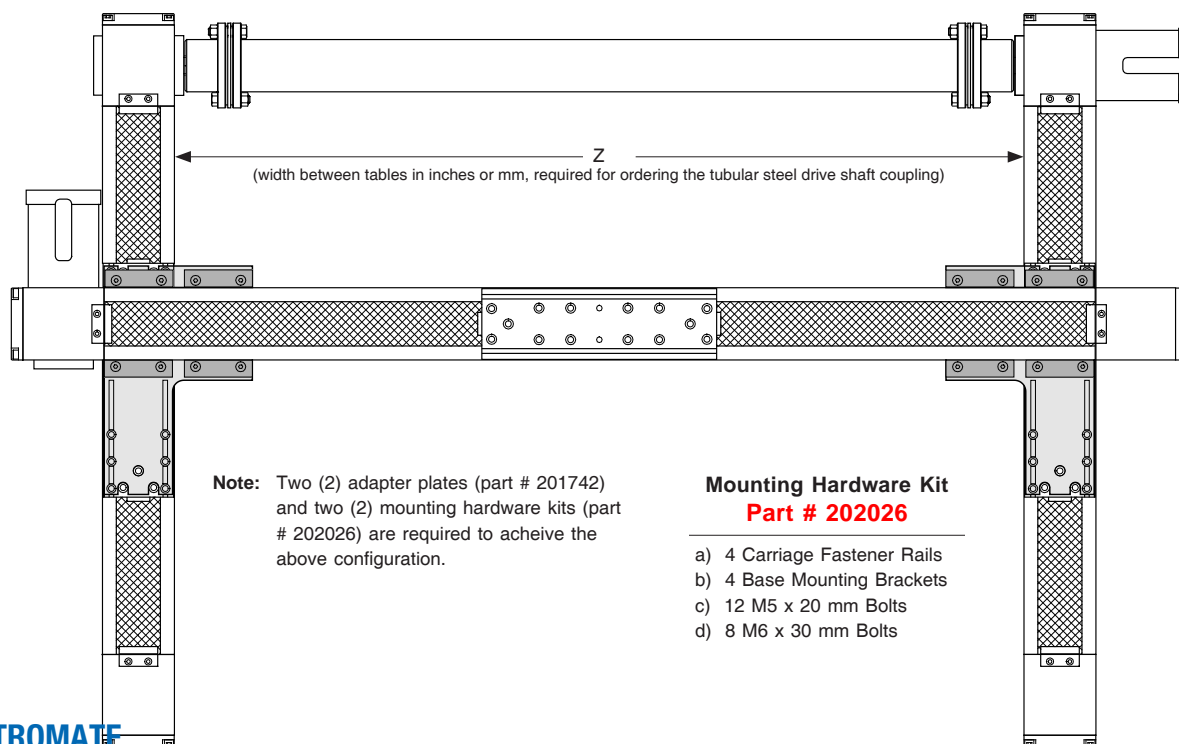
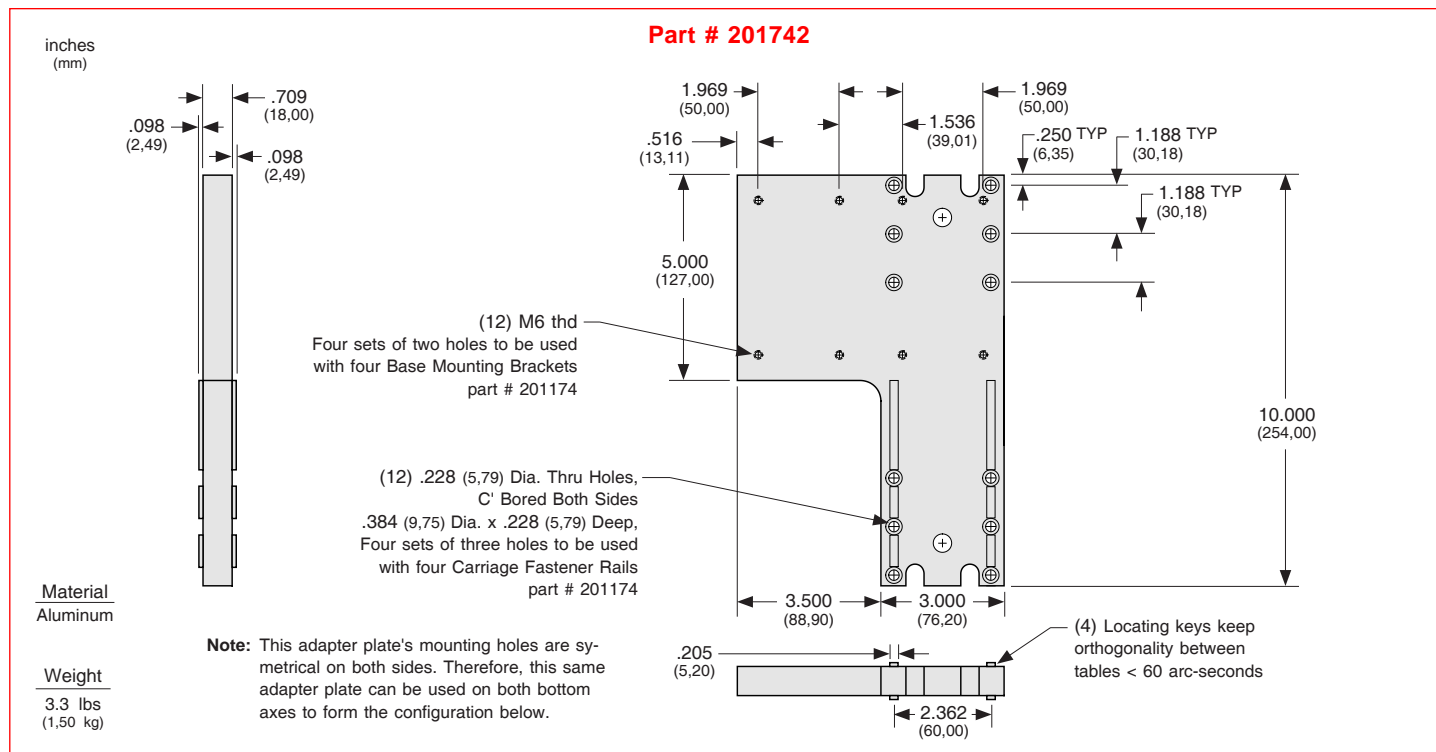


Mounting Hardware Kit
Part # 202025

- a) 8 Carriage Fastener Rails
- b) 24 M5 x 20 mm Bolts

Carriage Adapter Plate (550 Base to 550 Carriage)

Optional carriage adapter plates assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. Using one of the adapter plates below, allows a 550 series table to be mounted on top of a second 550 series table in order to make an X-Y axes system (see page K-12). Also, using two of the adapter plates below, allows a 550 series table to be mounted on top of two 550 series tables in order to make an X-Y axes gantry system (see below).

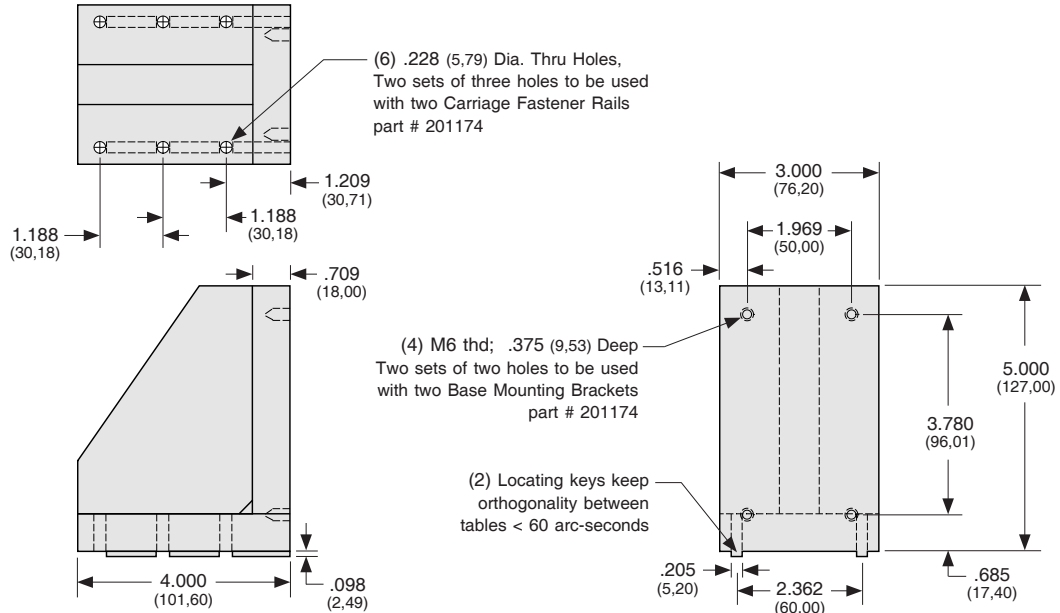


Horizontal Adapter Bracket (550 Series Base to 550 Carriage)

Optional horizontal adapter brackets assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. Using one of the adapter plates below, allows a 550 series table to be mounted on top of a second 550 series table in order to make an X-Y axes system. Also, using two of the adapter plates below, allows a 550 series table to be mounted on top of two 550 series tables in order to make an X-Y axes gantry system (see below).

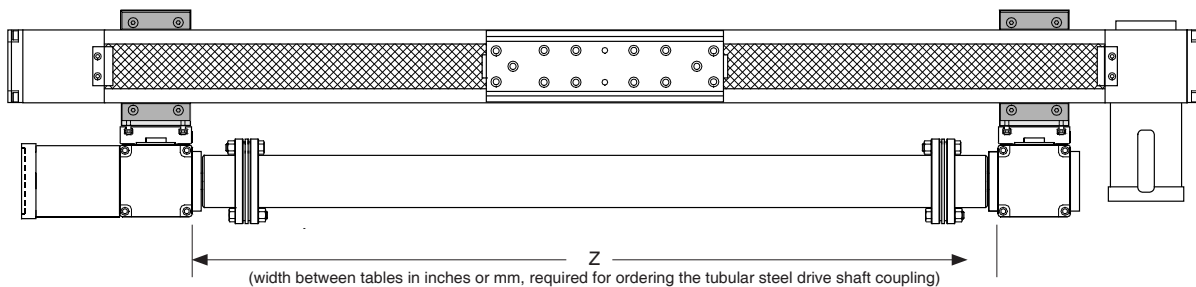
Part # 201171

inches
(mm)



Material
Aluminum

Weight
2.7 lbs
(1,22 kg)



Tubular Steel Drive Shaft Coupling

- Material - Steel
- Torsional Stiffness - 62,690 ft-lbs/rad (85,000 M-m/rad)
- Bore both sides - 18 mm with 5 mm keyway
- Maximum Length - 118 inches (3 meters)
- Maximum Speeds:

Length (Z)		Max Speed
(inches)	(mm)	(rpm)
20	500	3000
40	1000	3000
60	1500	2600
80	2000	1450
100	2500	950
118	3000	650

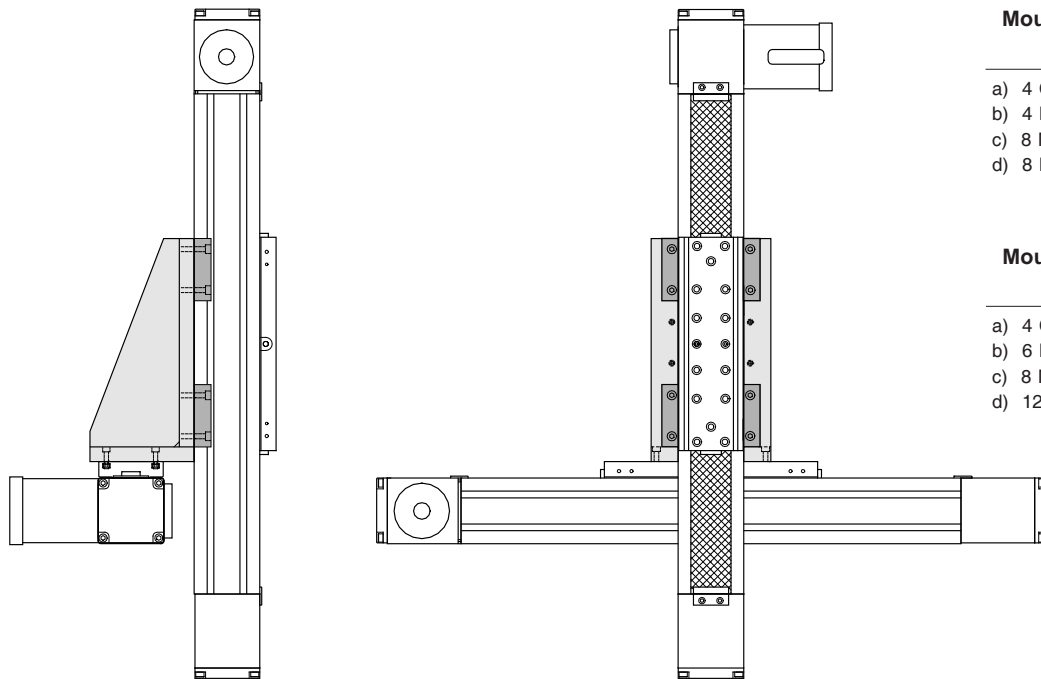
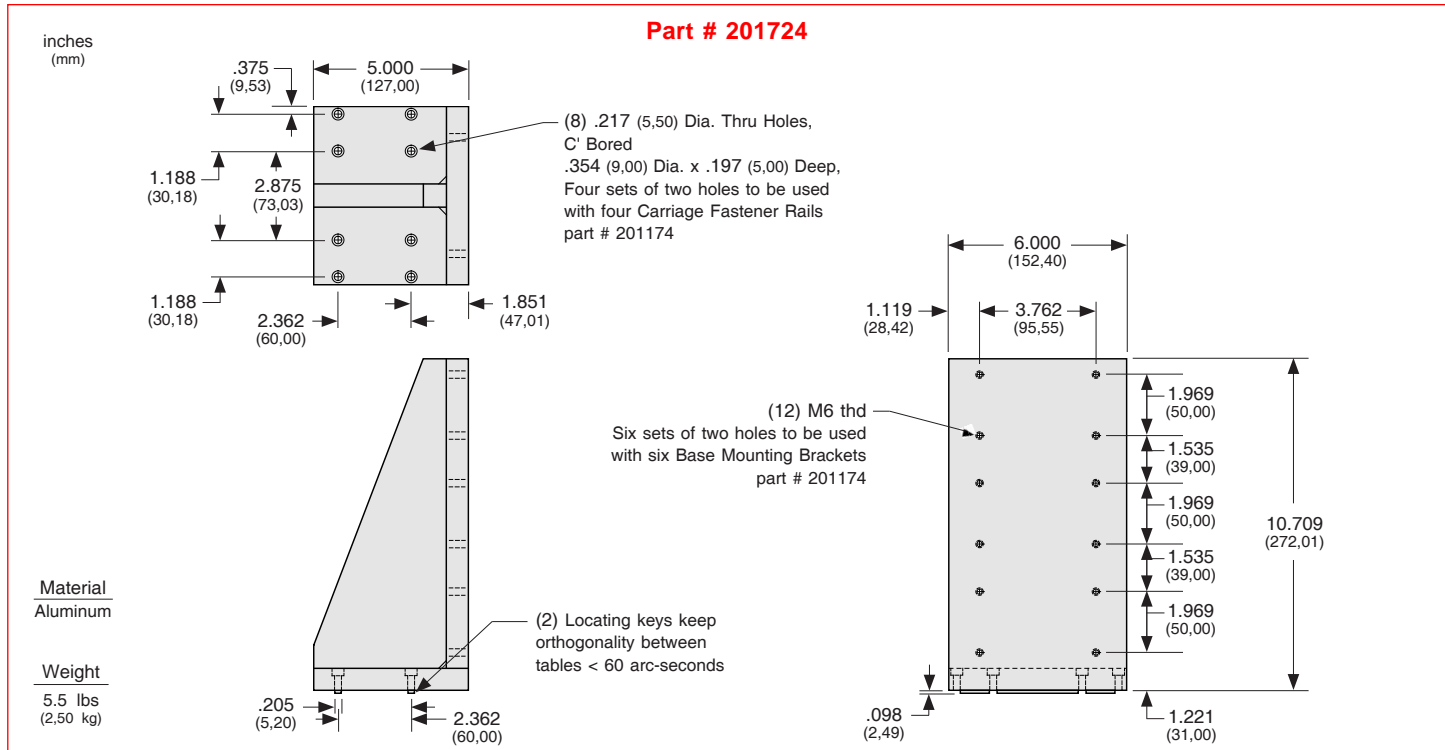
Note: Two (2) adapter plates (part # 201171) and two (2) mounting hardware kits (part # 202027) are required to achieve the above configuration.

**Mounting Hardware Kit
Part # 202027**

- a) 2 Carriage Fastener Rails
- b) 2 Base Mounting Brackets
- c) 6 M5 x 20 mm Bolts
- d) 4 M6 x 30 mm Bolts

Vertical Adapter Bracket (550 Base to 550 Carriage)

Optional vertical adapter brackets assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. The vertical adapter bracket below allows a 550 series table to be mounted on top of a second 550 series table in order to make an X-Z axes system.



Mounting Hardware Kit Part # 202028

- a) 4 Carriage Fastener Rails
- b) 4 Base Mounting Brackets
- c) 8 M5 x 20 mm Bolts
- d) 8 M6 x 30 mm Bolts

Mounting Hardware Kit Part # 202029

- a) 4 Carriage Fastener Rails
- b) 6 Base Mounting Brackets
- c) 8 M5 x 20 mm Bolts
- d) 12 M6 x 30 mm Bolts

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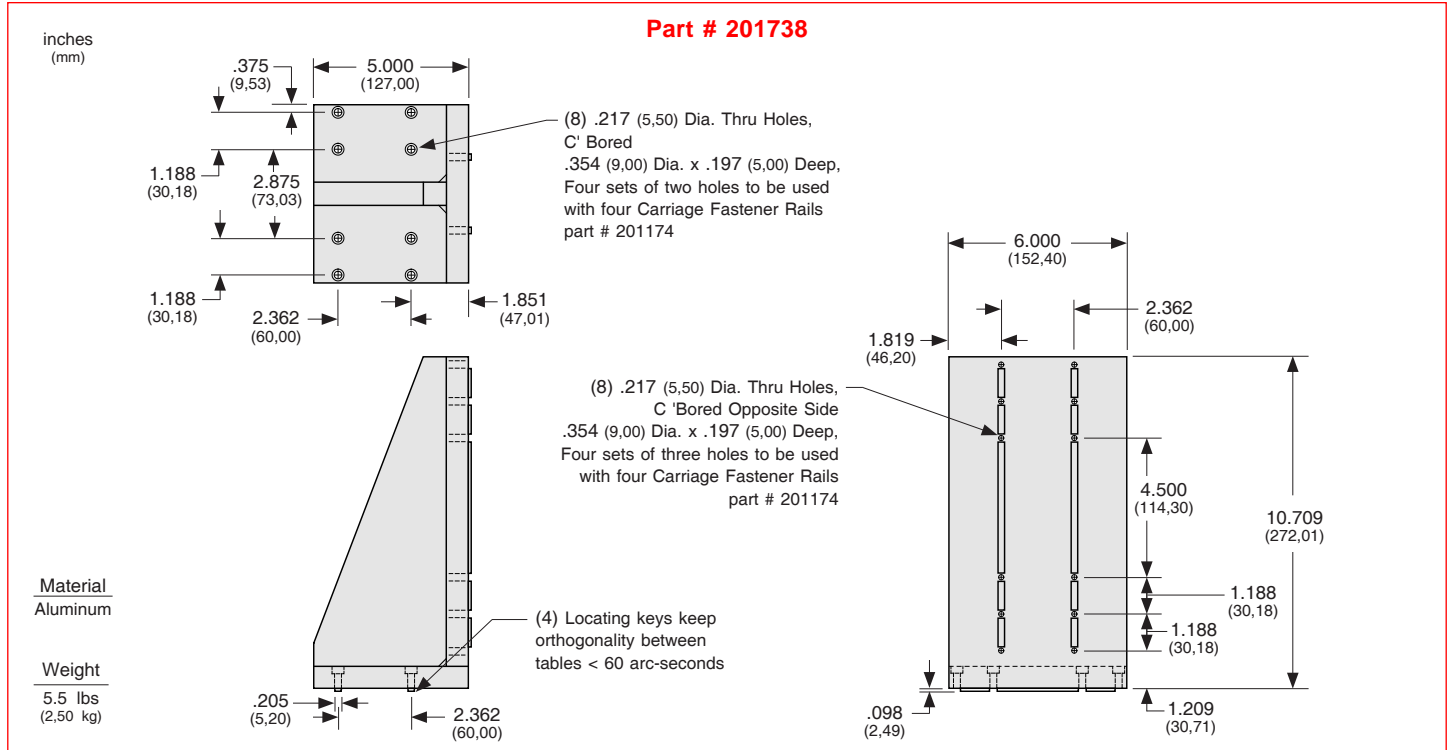
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Specifications Subject to Change Without Notice

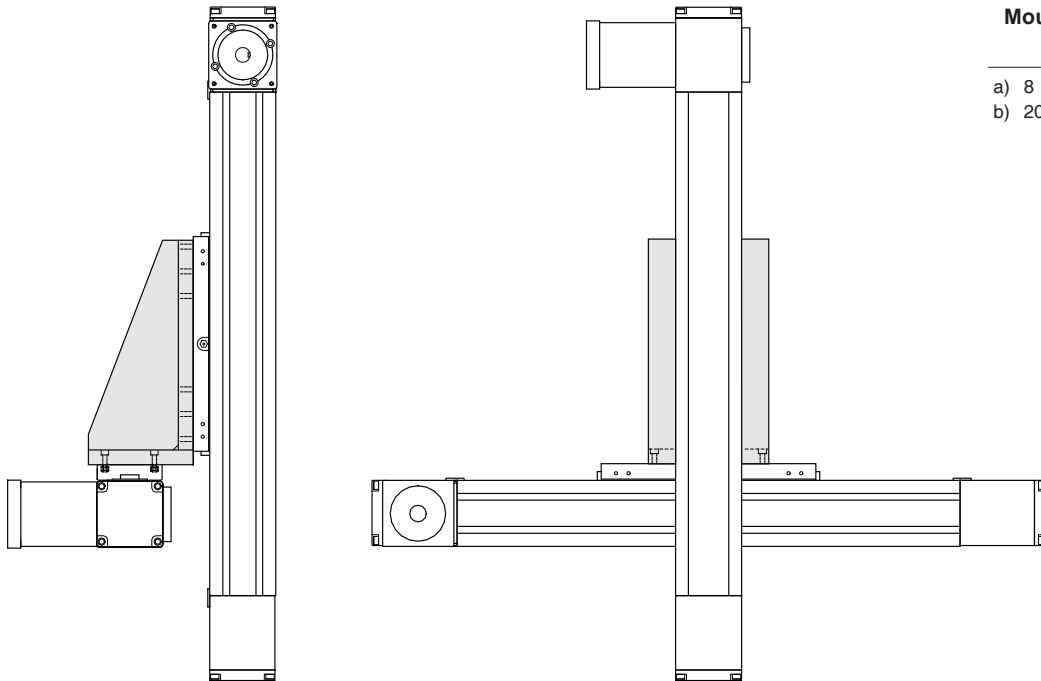
Vertical Adapter Bracket (550 Carriage to 550 Carriage)

Optional vertical adapter brackets assist in the creation of simple X-Y, X-Z, and X-Y-Z multiple axis systems. The vertical adapter bracket below allows two 550 series tables to be mounted carriage to carriage in order to make an X-Z axes system.



**Mounting Hardware Kit
Part # 202030**

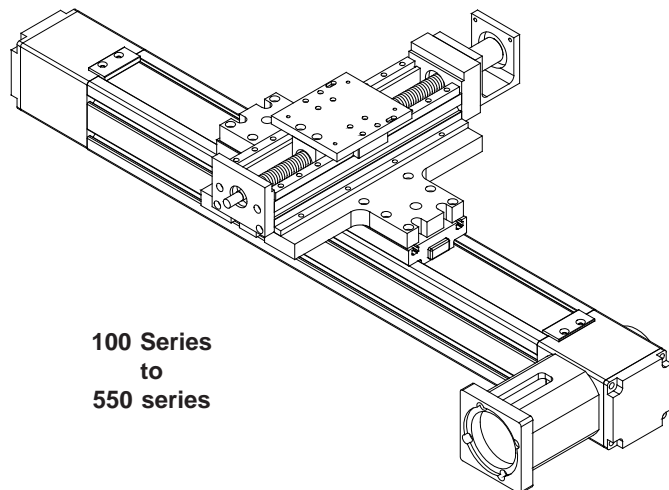
- a) 8 Carriage Fastener Rails
- b) 20 M5 x 20 mm Bolts



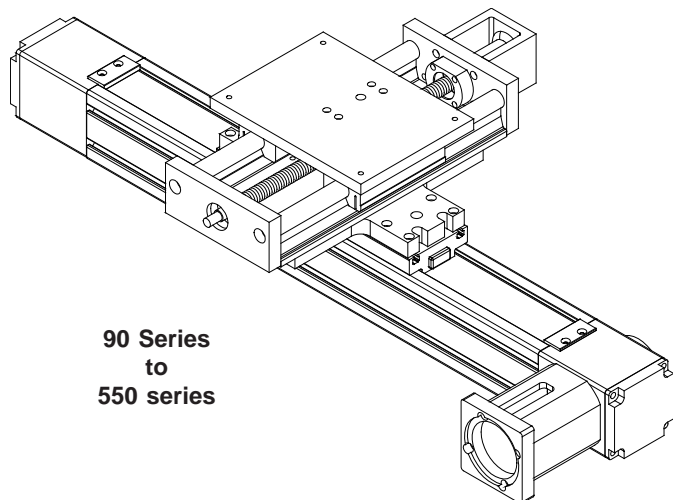
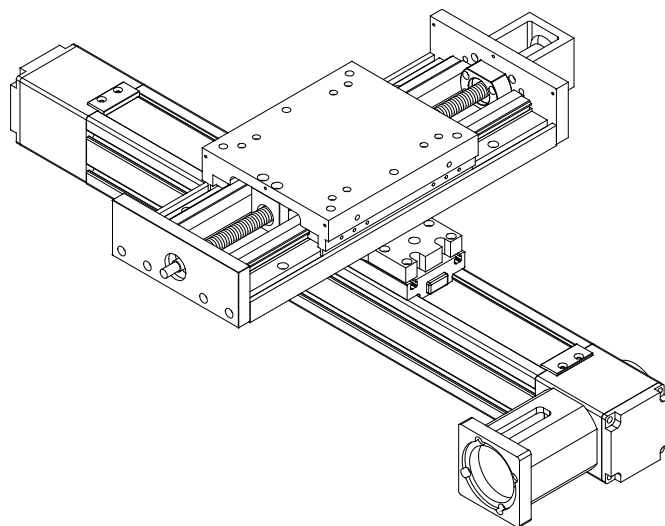
Multi-Axis Configurations

LINTECH can provide various adapter plates, horizontal adapter brackets, and vertical adapter brackets to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations using its many different standard positioning systems.

(X-Y) Configurations



150 Series
to
550 series



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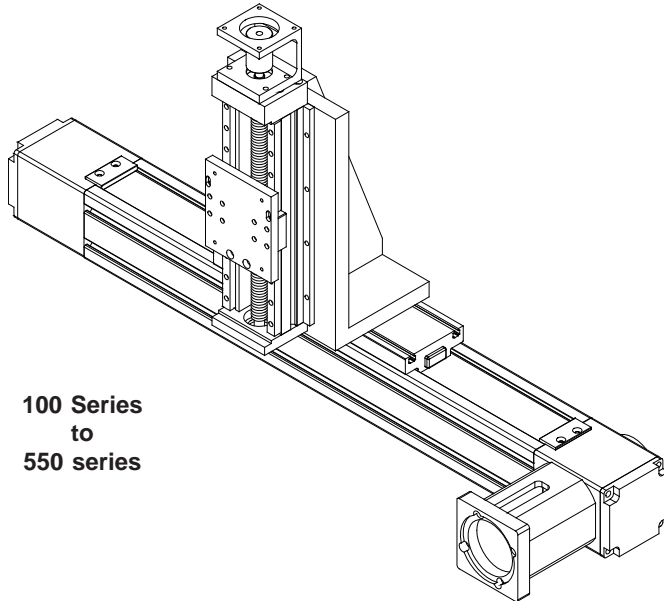
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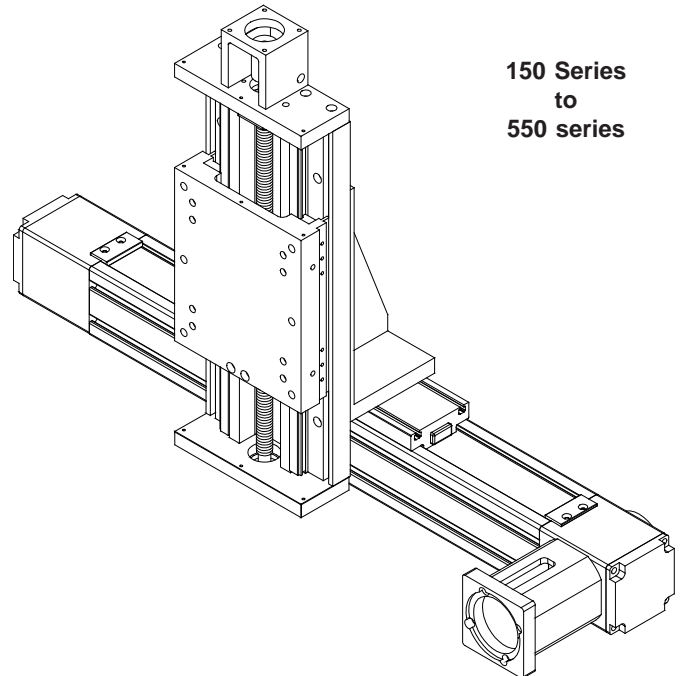
Multi-Axis Configurations

LINTECH can provide various adapter plates, horizontal adapter brackets, and vertical adapter brackets to facilitate the construction of X-Y, X-Z, and X-Y-Z multiple axis configurations using its many different standard positioning systems.

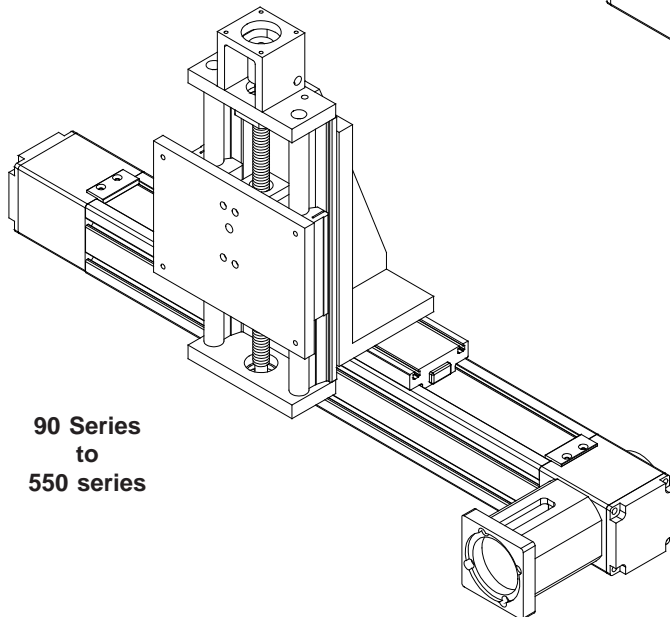
(X-Z) Configurations



100 Series
to
550 series



150 Series
to
550 series



90 Series
to
550 series

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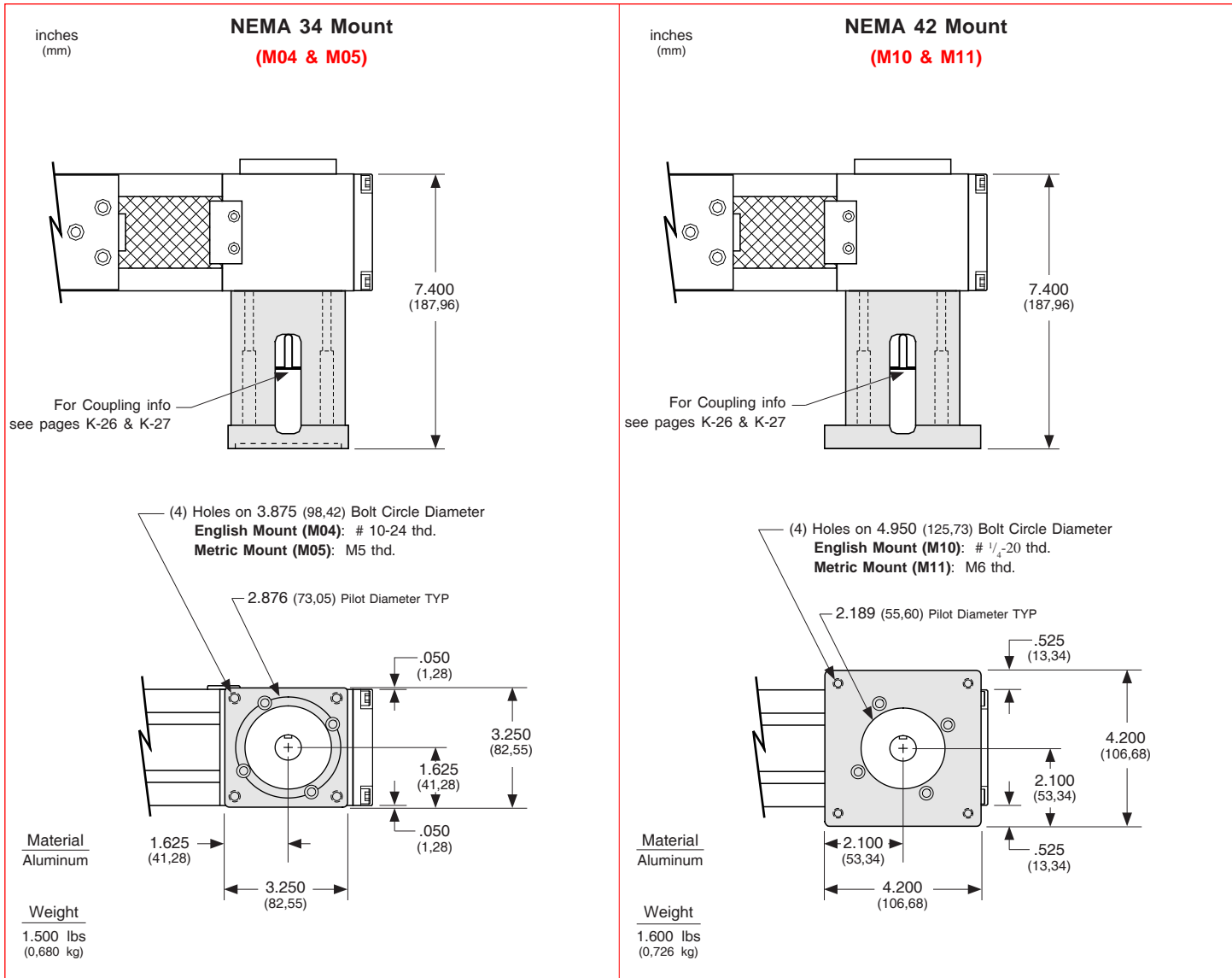
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NEMA 34 & NEMA 42 Motor Mounts

NEMA 34 & 42 motor mounts can be ordered with either English, or Metric threads. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



Chrome Plated Linear Bearings & Rails

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the linear bearings, and linear rails, will offer superior resistance to corrosion than stainless steel components, resulting in longer table life. The process uniformly deposits dense, hard, high chromium alloy on the rails, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent material and will not crack or peel off under the high point loading of balls on the rail. This chrome plating process differs from a normal hard chrome plate which just lays on the surface of the part plated.

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End of Travel (EOT) Switches & Home Switch

LINTECH provides several options for EOT & home switches. When ordered with a *LINTECH* 550 series table, each switch is mounted to the side of the table, while the actuating cams are mounted to the carriage assembly. The *T-slot* which runs along both sides of the 550 series, allows the switches to be located anywhere along the table. The switches are pre-wired by *LINTECH* for easy interfacing to the users Motion Controller.

End of Travel (EOT) Switches

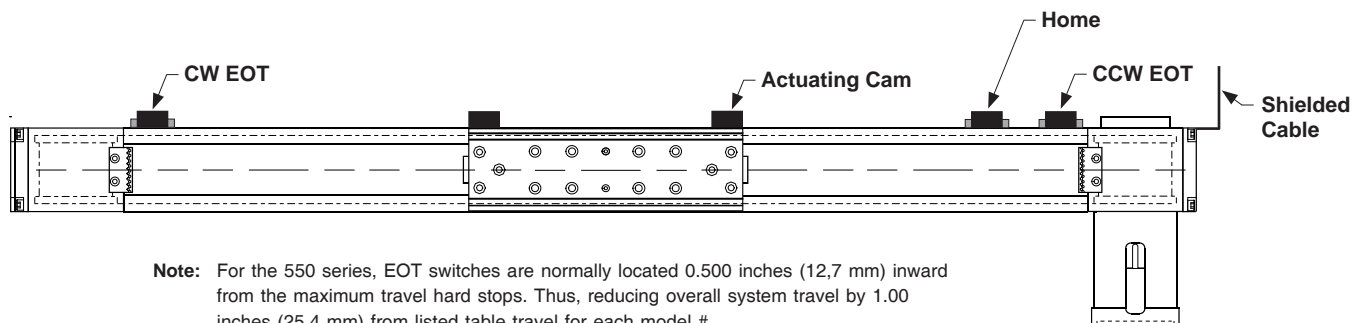
End of travel (EOT) switches can be utilized by a motion controller to stop carriage motion, thereby preventing any damage to personnel, table carriage, or user mounted load if the extreme end of travel has been reached by the carriage. There are two EOT switches mounted to the side of the table, one on each end. The CCW switch is mounted at the motor mount end, while the CW switch is located at the opposite end of the table. *LINTECH* provides normally closed (NC) end of travel switches. This provides for a power-off fail safe system, where the position controller can detect broken wires. *It is highly recommended that any positioning table used with a position controller, should have end of travel switches installed for protection of personnel, table carriage, and user mounted load.*

Home Switch

The home switch can be utilized by a motion controller as a known fixed mechanical location on the positioning table. The switch is located between the EOT switches, near the motor mount end, and is a normally open (NO) switch.

Switch Locations

The following diagram shows the locations of the switches when ordered from *LINTECH*.



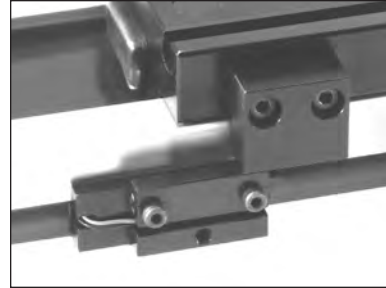
Note: For the 550 series, EOT switches are normally located 0.500 inches (12,7 mm) inward from the maximum travel hard stops. Thus, reducing overall system travel by 1.00 inches (25,4 mm) from listed table travel for each model #.

Note: Each switch can be located anywhere along the T-slots, which run on both sides of the table.

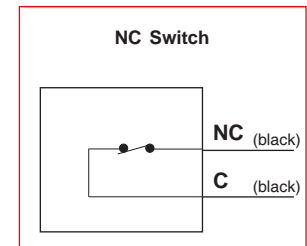
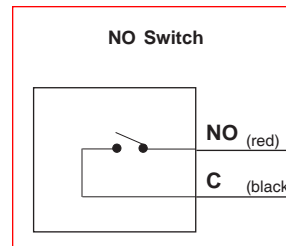
Switch Type	Cost	Repeatability inches (microns)	Actuated	Power Supply Required	Activation Area inches (mm)	Comments
reed	least expensive	+/- 0.0020 (50)	magnetic	No	0.30 (7,62)	for non-contact & low repeatable applications
hall effect	medium priced	+/- 0.0002 (5)	magnetic	Yes	0.32 (8,13)	for non-contact and wash down applications
proximity	most expensive	+/- 0.0002 (5)	non-magnetic	Yes	1.75 (44,45)	for non-contact, high speed, & wash down applications

Note: The repeatability of any switch is dependent upon several factors: carriage speed, accel rate, load weight, switch style, and the position controller. *LINTECH*'s ratings are based upon a carriage speed of 0.5 inches/sec (12.7 mm/sec) and a no load condition.

End of Travel (EOT) Switches & Home Switch

Non-Contact Reed Switches

Repeatability	: +/- 0.0020 inch (50 microns)
Electrical	: 1.0 amps @ 125 VAC 0.5 amps @ 100 VDC
Activation Style	: magnetic
Activation Area	: 0.30 inches (7,62 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: non wash down
Added Table Width	: 0.45 inch (11,4 mm) (EOT switches) 0.45 inch (11,4 mm) (Home switch)
Individual Switch Wiring	: 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is 10 foot (3 m) shielded cable,
ordered with any table) 6 conductor, 24 AWG,
unterminated leads

Wire Color	Description
Black	CW EOT (black) NC
Blue	CW Common (black) NC
Red	CCW EOT (black) NC
White	CCW Common (black) NC
Brown	HOME (red) NO
Green	HOME Common (black) NO
Silver	Shield

CW - Clockwise
CCW - Counter Clockwise
EOT - End of Travel
NC - Normally Closed
NO - Normally Open

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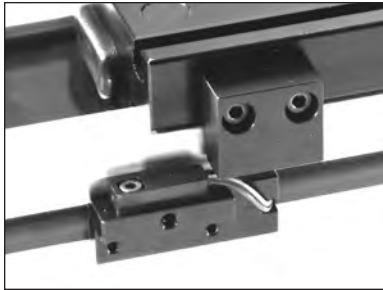
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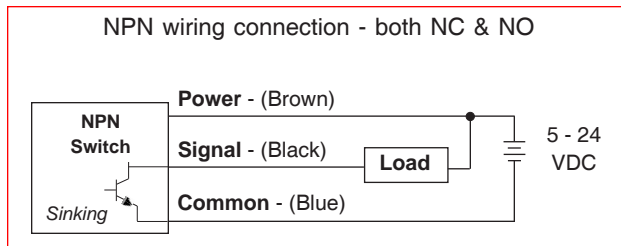
Specifications Subject to Change Without Notice

End of Travel (EOT) Switches & Home Switch

Non-Contact Hall Effect Switches



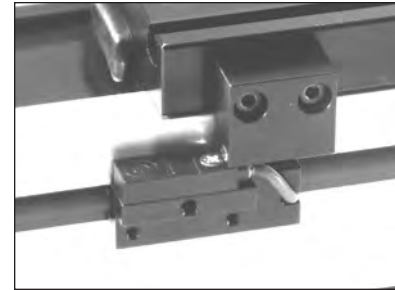
Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 5 - 24 VDC 15 mA - power input 25 mA max - signal
Actuation Style	: magnetic
Activation Area	: 0.32 inches (8,13 mm) of travel
Temperature Range	: - 10° C to + 60° C
Environment	: wash down
Added Table Width	: 0.45 inch (11,4 mm) (EOT switches) 0.45 inch (11,4 mm) (Home switch)
Individual Switch Wiring	: 12 inch (305 mm) leads



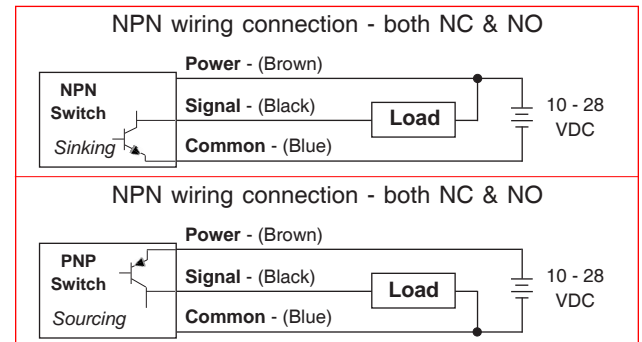
Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is ordered with any table)
10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Non-Contact Proximity Switches



Repeatability	: +/- 0.0002 inch (5 microns)
Electrical	: 10 - 28 VDC 15 mA - power input 100 mA max - signal
Actuation Style	: non-magnetic cam
Activation Area	: 1.75 inches (44,45 mm) of travel
Temperature Range	: - 25° C to + 75° C
Environment	: IEC IP67 wash down
Added Table Width	: 0.45 inch (11,4 mm) (EOT switches) 0.45 inch (11,4 mm) (Home switch)
Individual Switch Wiring	: 6.5 foot (2 m) cable for NPN 3.3 foot (1 m) cable for PNP

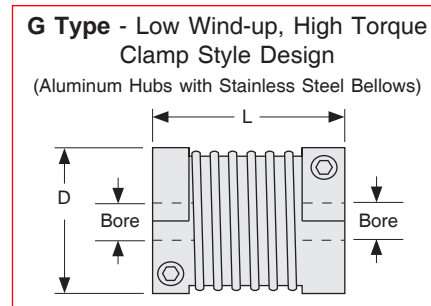
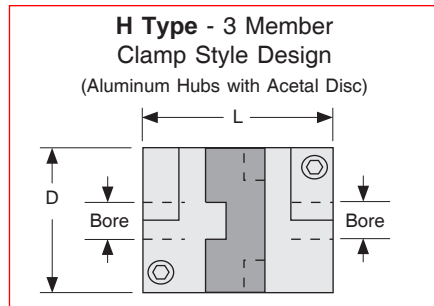


Standard *LINTECH* Wiring : from table end plate,
(provided when switch option is ordered with any table)
10 foot (3 m) shielded cable;
9 conductor, 24 AWG,
unterminated leads

Wire Color	Description		
Brown	CW Power	(brown)	switch NC
Black	CW EOT	(black)	
Blue	CW Common	(blue)	
Red	CCW Power	(brown)	switch NC
White	CCW EOT	(black)	
Green	CCW Common	(blue)	
Orange	Home Power	(brown)	switch NO
Yellow	Home	(black)	
Grey	Home Common	(blue)	
Silver	Shield		

Motor Couplings

LINTECH provides three different types of couplings that can be used to mount a motor to a positioning table. These couplings compensate for misalignment between the motor shaft & belt drive shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model Number	D inches (mm)	L inches (mm)	Table	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
				Motor	Minimum (in) (mm)	Maximum (in) (mm)					
H197-018-aaa	1.97 (50,0)	2.35 (59,7)	018	aaa	.375 10	.750 20	7.6 (215)	3.69 (674)	1.1 (0,043)	3,600 (25,4)	
H225-018-aaa	2.25 (57,2)	3.07 (78,0)	018	aaa	.500 12	1.000 24	13.1 (371)	8.29 (1516)	0.6 (0,024)	5,300 (37,4)	
G177-018-aaa	1.77 (45,0)	2.48 (63,0)	018	aaa	.375 10	.750 20	7.1 (200)	2.78 (508)	0.2 (0,008)	4,250 (30,0)	
G220-018-aaa	2.20 (56,0)	2.56 (65,0)	018	aaa	.500 12	1.000 24	10.6 (300)	6.41 (1172)	0.04 (0,002)	7,100 (50,0)	
G260-018-aaa⁽¹⁾	2.60 (66,0)	3.07 (78,0)	018	aaa	.625 16	1.000 24	21.2 (600)	17.91 (3276)	0.03 (0,001)	9,600 (68,0)	
Possible values for aaa	375 = .375 inch 500 = .500 inch 625 = .625 inch 750 = .750 inch		999 = 1.000 inch		010 = 10 mm 012 = 12 mm 014 = 14 mm 016 = 16 mm		018 = 18 mm 019 = 19 mm 020 = 20 mm 024 = 24 mm				

Footnotes:

- (1) This coupling option can not be used with the optional NEMA 34 & 42 motor mounts because its diameter is too large. Custom motor mounts can be provided upon request. See page K-25 for maximum coupling diameter and length specifications for use with the optional NEMA 34 & 42 motor mounts.

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Motor Couplings

Coupling	Cost	Torque Capacity	Wind-up	Suggested Motor	Comments
H Type	less expensive	medium	medium	stepper or servo	use for high accels & for starting & stopping large inertia loads
G Type	more expensive	high	the least	servo	use for very high torque requirements & very high servo accelerations

Specification	550 Series NEMA 34 & 42 bracket inches (mm)
Shaft extension diameter at motor mount end	0.709 (18,0)
Maximum coupling diameter	2.300 (58,42)
Maximum coupling length	3.100 (78,74)
Note: Custom brackets available upon request.	

Coupling Part Numbers

C293 H197-018-375	C359 H225-018-500	C573 G177-018-375	C639 G220-018-500	C684 G260-018-625
C294 H197-018-500	C360 H225-018-625	C574 G177-018-500	C640 G220-018-625	C685 G260-018-750
C295 H197-018-625	C361 H225-018-750	C575 G177-018-625	C641 G220-018-750	C686 G260-018-999
C296 H197-018-750	C362 H225-018-999	C576 G177-018-750	C642 G220-018-999	C687 G260-018-016
C297 H197-018-010	C363 H225-018-012	C577 G177-018-010	C643 G220-018-012	C688 G260-018-018
C298 H197-018-012	C364 H225-018-014	C578 G177-018-012	C644 G220-018-014	C689 G260-018-019
C299 H197-018-014	C365 H225-018-016	C579 G177-018-014	C645 G220-018-016	C690 G260-018-020
C300 H197-018-016	C366 H225-018-018	C580 G177-018-016	C646 G220-018-018	C691 G260-018-024
C301 H197-018-018	C367 H225-018-019	C581 G177-018-018	C647 G220-018-019	
C302 H197-018-019	C368 H225-018-020	C582 G177-018-019	C648 G220-018-020	
C303 H197-018-020	C369 H225-018-024	C583 G177-018-020	C649 G220-018-024	

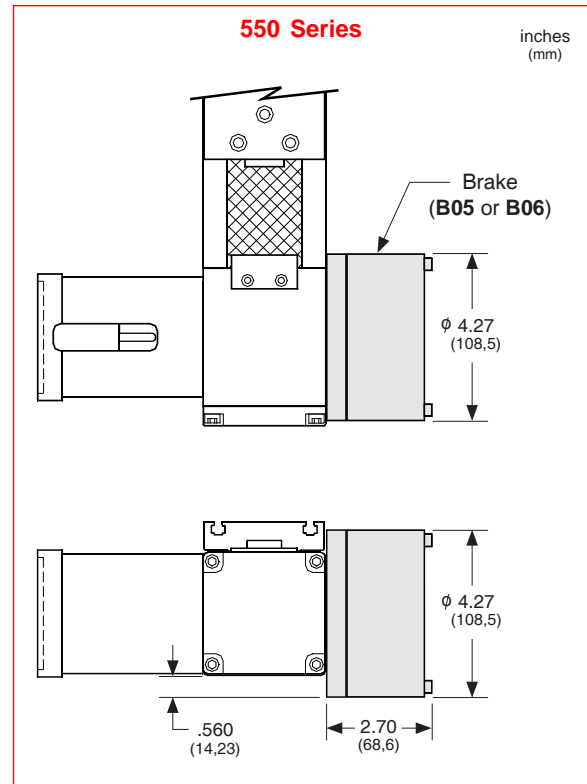
Power-off Electric Brakes

For vertical table applications, or for those applications requiring the load to be locked securely in place, an electric brake may be mounted to the positioning table. The 550 series will have the brake mounted to the "Thru Drive Shaft" option. With proper wiring from a control system, this power-off friction brake can ensure that the carriage is firmly held in place, when no electric power is applied to the brake. When power is applied to the brake, the brake is opened or "released".

For proper emergency braking of the 550 series table, this electric brake needs to be interfaced to a position controller or relay network. *LINTECH* also provides 24 & 90 VDC power supplies which can be used to power the brakes.

Brakes

Model Number	Holding Force in-lbs (N-m)	Excitation Voltage volts	Current amps	Weight lbs (kg)
B05	180 (20,3)	24 VDC	1.136	4.8 (2,18)
B06	180 (20,3)	90 VDC	0.287	4.8 (2,18)



Note: This power-off electric brake MUST NOT be engaged when the positioning table is in motion. Moving the table with the brake applied could damage the brake and the positioning table. Also, continuous use of this brake to stop a table (load) that is in motion could damage the brake and the positioning table. Dynamic braking of a positioning table should be done by the motor and not the brake.

Power Supplies

Model Number	DC Output			AC Input		
	volts	amps	style	volts	amps	Hz
41970	5	3.0	regulated	120 / 240	0.8 / 0.4	47-63
37488	24	1.2	regulated	120 / 240	0.8 / 0.4	47-63
37489	90	0.8	unregulated	120	1.0	50/60
37490	90	0.8	unregulated	240	0.5	50/60

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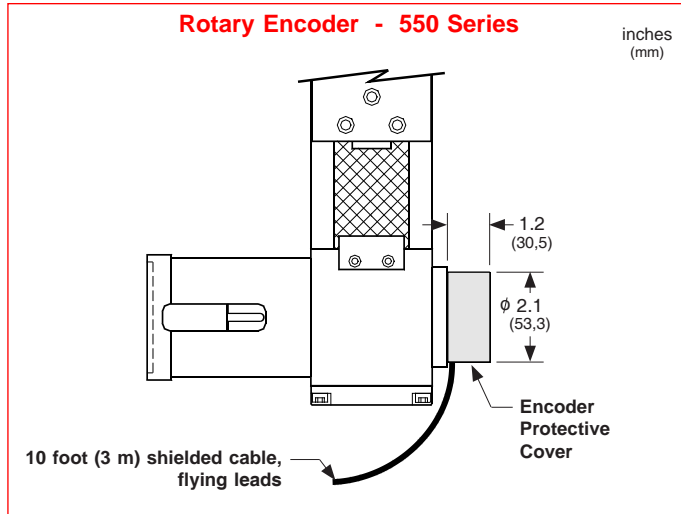
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Rotary Incremental Encoders

Shaftless, incremental, optical rotary encoders can be mounted to the "Thru Drive Shaft" option on the 550 series positioning tables. These encoders provide positional feedback to either a motion controller, or a digital position display.



Wire Color	Description
White	Channel A ⁺ (or A)
Blue	Channel A ⁻ (or \bar{A})
Green	Channel B ⁺ (or B)
Orange	Channel B ⁻ (or \bar{B})
White/Black	Channel Z ⁺ (or Z)
Red/Black	Channel Z ⁻ (or \bar{Z})
Black	Common
Red	+ 5 vdc (+/- 5%)

Specification	ROTARY ENCODERS		
	E01	E02	E03
Line Count	500 lines/rev	1000 lines/rev	1270 lines/rev
Pre Quadrature Resolution	0.002 revs/pulse	0.001 revs/pulse	0.00079 revs/pulse
Post Quadrature Resolution	0.0005 revs/pulse	0,00025 revs/pulse	0.00019 revs/pulse
Maximum Speed	50 revs/sec		
Maximum Accel	40 revs/sec ²		
Excitation Power	+ 5 VDC @ 125 ma		
Operating Temperature	32° F to 140° F (0° C to 60° C)		
Humidity	20% to 80% non condensing		
Shock	10 G's for 11 msec duration		
Weight	0.7 lbs (0,283 kg)		
Cable Length	10 ft (3 m), unterminated 26 gauge leads		
Zero Reference Output	Once per revolution		
Outputs	TTL square wave; Two channel (A+ & B+); Differential (A- & B-); Line Driver		

Notes

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300 & 400 Series Positioning Tables

300 Series Introduction _____	L-2
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300 Series NEMA 34 Option _____	L-9
Home Switch Options _____	L-10



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Single Axis Rotary Table

LINTECH's 300 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- *Welding*
- *Test Stands*
- *Part Insertion*
- *Laser Positioning*
- *Liquid Dispensing*
- *Semiconductor Processing*
- *Gluing*
- *Pick & Place*
- *Part Scanning*
- *Inspection Stations*
- *General Automation*

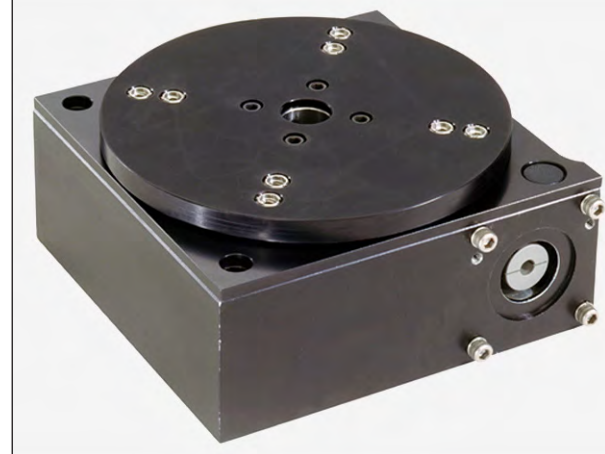
Quality Construction

These tables feature a rigid pair of quality angular contact bearings which produce smooth table top rotation. The low backlash precision worm gear drive provides exceptional accuracy and repeatability. Load capacities to 225 pounds (102 kg) are available, with table top diameters of 6, 8, 10, and 12 inches. All aluminum components have a black anodized finish and each table has a standard NEMA 23 motor mount. Threaded steel inserts in the table top provide for easy mounting of the user load, while the 0.75 inch (19 mm) diameter through hole provides easy access from below. With 3 different gear ratios for each table top, the 300 series tables perform well in either high speed or high resolution applications. Mounting a 300 series rotary table directly to any of LINTECH's linear positioning tables, produces a unique multi-axis system.

Standard Features - 300 Series

- Worm gear drive
- NEMA 23 & 34 motor mounts
- Standard & Precision versions
- 45, 90, & 180:1 gear reductions
- Load capacity to 225 lbs (102 kg)
- 30 revs/sec maximum input speed
- 10 arc-sec unidirectional repeatability
- 6, 8, 10, & 12 inch table top diameters
- CAD drawings available via the internet
- 0.75 inch (19 mm) diameter through hole
- English & Metric inserts for load mounting

300 Series



Single Axis Rotary Table

LINTECH's 400 series positioning tables offer precision performance and design flexibility for use in a wide variety of Motion Control applications.

- *Welding*
- *Test Stands*
- *Part Insertion*
- *Laser Positioning*
- *Liquid Dispensing*
- *Semiconductor Processing*
- *Gluing*
- *Pick & Place*
- *Part Scanning*
- *Inspection Stations*
- *General Automation*

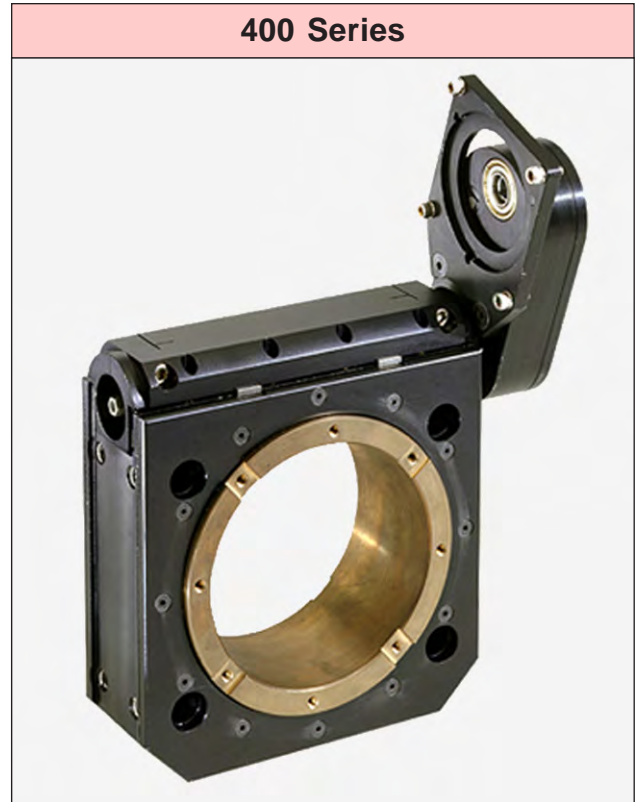
Quality Construction

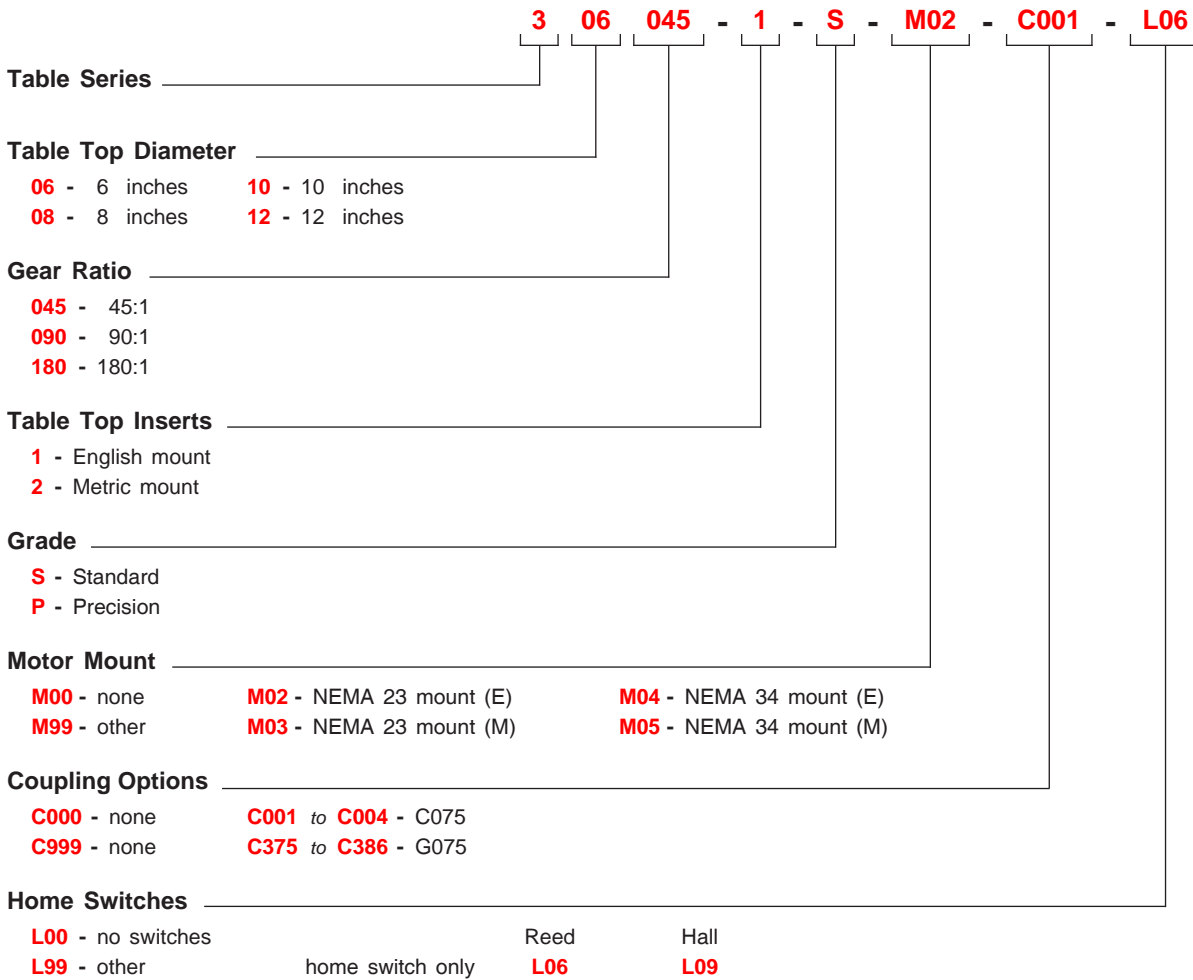
These tables feature a rigid pair of 4 point contact radial bearings which produce smooth table top rotation. The low backlash precision worm gear drive provides years of exceptional accuracy and repeatability. This rugged construction offers load capacities to 1000 pounds (453 kg) with a 5.48 inch (139 mm) table top diameter. Threaded steel inserts in the table top provide for easy mounting of the user load, while the 4.5 inch (114 mm) diameter through hole provides easy access from below. The NEMA 34 mount can be rotated 360 degrees around either side of the table. With 5 different gear ratios, the 400 series tables perform well in either high speed or high resolution applications.

Standard Features - 400 Series

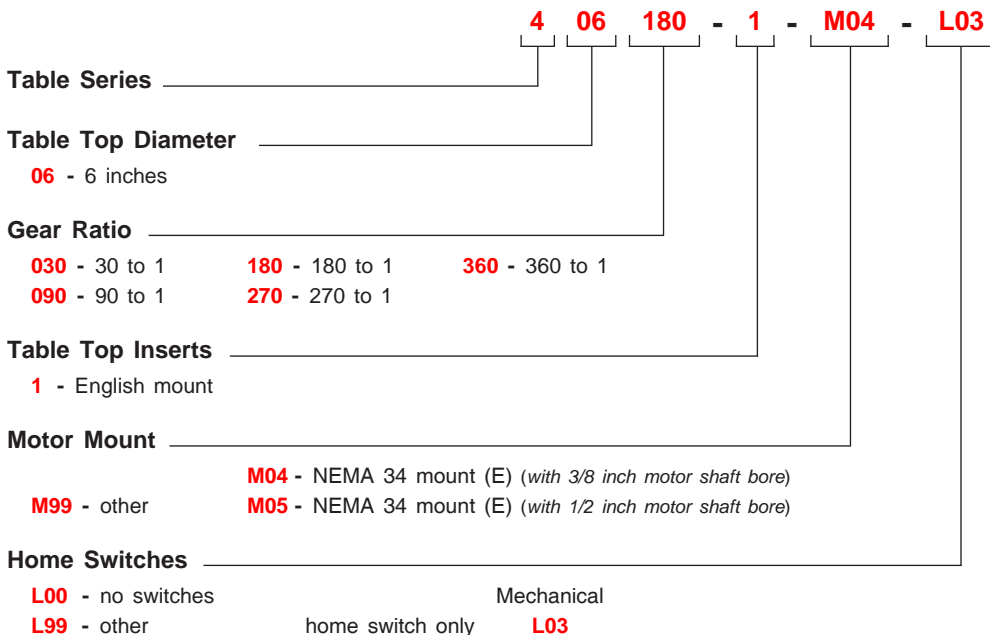
- Worm gear drive
- NEMA 34 motor mount
- Standard & Precision versions
- English inserts for load mounting
- 9 revs/sec maximum input speed
- Load capacity to 1,000 lbs (453 kg)
- 12 arc-sec unidirectional repeatability
- 5.48 inch (139 mm) table top diameter
- CAD drawings available via the internet
- 4.5 inch (114 mm) diameter through hole
- 30, 90, 180, 270, & 360:1 gear reductions

400 Series





(E) - English Interface
(M) - Metric Interface



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(E) - English Interface

Specifications

Load Capacities	300 series ⁽¹⁾	400 series ⁽¹⁾
Dynamic Horizontal (1 million revs)	225 lbs (102 kg)	1000 lbs (453 kg)
Dynamic Inverted (1 million revs)	100 lbs (45 kg)	1000 lbs (453 kg)
Static Horizontal	250 lbs (113 kg)	1000 lbs (453 kg)
Dynamic Moment (1 million revs)	20 ft-lbs (27 N-m)	225 ft-lbs (305 N-m)
Static Moment	25 ft-lbs (34 N-m)	250 ft-lbs (339 N-m)
Maximum Input Speed	30 rev/sec	9 rev/sec
Maximum Input Acceleration	75 rev/sec ²	50 rev/sec ²
Maximum Input Torque	125 oz-in (0,88 N-m)	1,000 oz-in (7,06 N-m)

Other	300 series	400 series
Table Material	Base & Table Top - 6061 black anodized aluminum	
Worm Wheel Type	Bronze (AGMA - class 10)	
Worm Gear Type	Steel (AGMA - class 10)	
Duty Cycle	60 %	
(gear ratio)	45:1 90:1 180:1	30:1 90:1 180:1 270:1 360:1
Maximum Table Top Speed	40 rpm 20 rpm 10 rpm	18 rpm 6 rpm 3 rpm 2 rpm 1.5 rpm
Worm Gear Efficiency	50 % 60 % 70 %	50 % 60 % 60 % 60 % 60 %
Worm Gear Inertia (oz-in ²)	11.5 11.5 11.5	38.6 38.6 50.2 61.7 73.3
Accuracy	< 150 arc-sec	
Unidirectional Repeatability	< 10 arc-sec	
Bidirectional Repeatability	< 40 arc-sec	
Backlash	< 30 arc-sec	
Runout (vertical runout)	Standard < 0.003 in (0,076 mm) ⁽²⁾ Precision < 0.001 in (0,025 mm) ⁽²⁾	< 0.002 in (0,05 mm) ⁽³⁾
Concentricity (radial runout)	Standard < 0.003 in (0,076 mm) ⁽⁴⁾ Precision < 0.001 in (0,025 mm) ⁽⁴⁾	< 0.002 in (0,05 mm) ⁽⁵⁾
Wobble (axis runout)	Standard < 80 arc-sec ⁽⁶⁾ Precision < 40 arc-sec ⁽⁶⁾	< 60 arc-sec ⁽⁶⁾
Breakaway Torque	< 20 oz-in (0,141 N-m)	< 60 oz-in (0,424 N-m)

Footnotes:

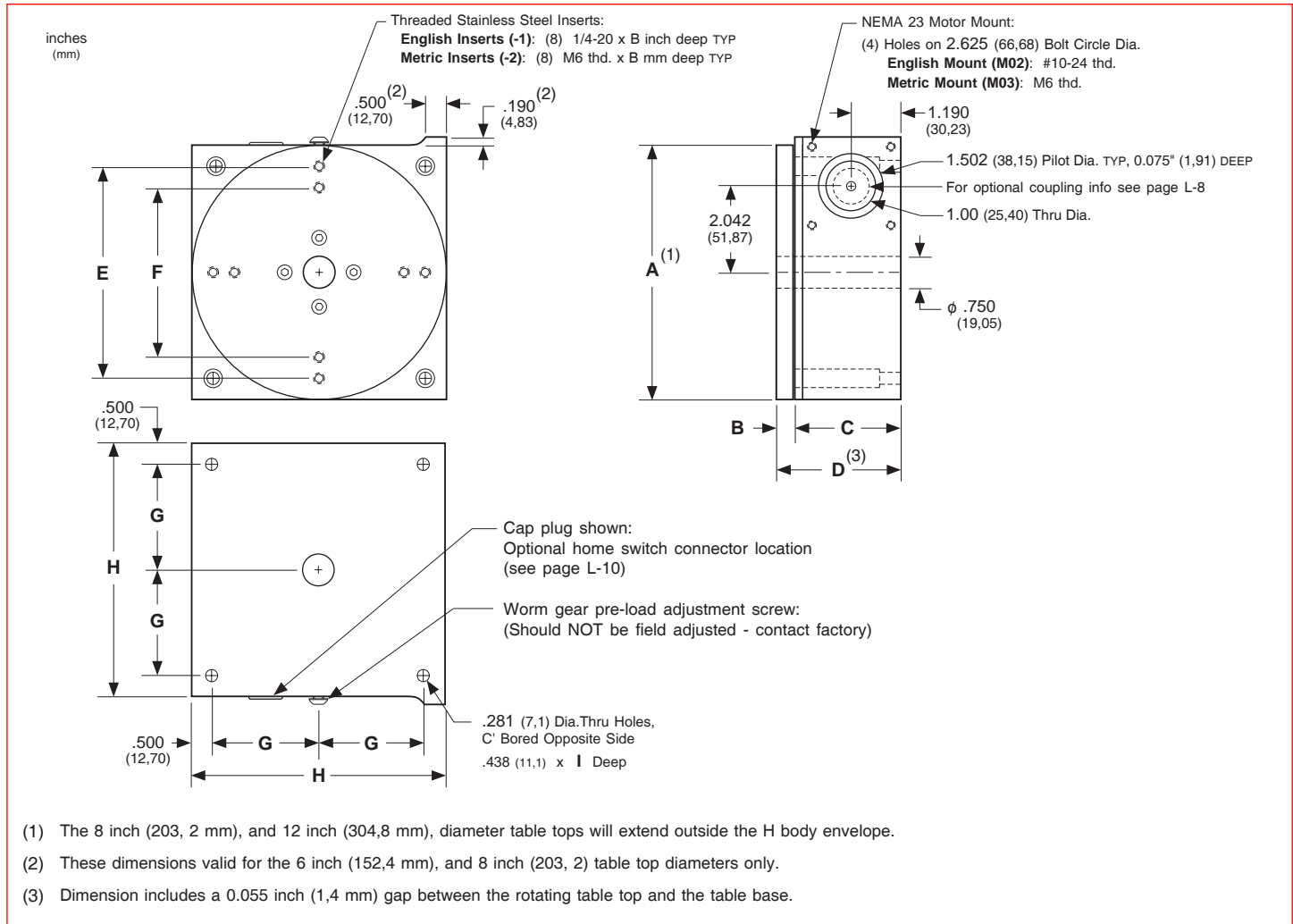
- (1) Dynamic load capacities & life are limited by the stresses exerted upon the worm gear assembly.
- (2) Measured at 6 inches (152,4 mm) from table top center. Total indicator runout.
- (3) Measured at 5.5 inches (139,7 mm) from table top center. Total indicator runout.
- (4) Measured at 0.75 inches (19,1 mm) from table top center. Total indicator runout.
- (5) Measured at 4.5 inches (114,3 mm) from table top center. Total indicator runout.
- (6) Based on the centerline of the table top.

Dimensions & Specifications

Model Number	Table Dimensions inches (mm)				Mounting Dimensions inches (mm)					Table Top Weight	Table Weight
	A	B	C	D	E	F	G	H	I	lbs (kg)	lbs (kg)
306xxx-1-S	6.000 (152,4)	0.375 (9,5)	2.500 (63,5)	2.930 (74,4)	5.000 (127,0)	4.000 (101,6)	2.500 (63,5)	6.000 (152,4)	2.000 (50,8)	1.1 (0,5)	11.0 (5,0)
308xxx-1-S	8.000 (203,2)	0.500 (12,7)	2.500 (63,5)	3.055 (77,6)	6.000 (152,4)	4.000 (101,6)	2.500 (63,5)	6.000 (152,4)	2.000 (50,8)	2.5 (1,2)	12.0 (5,4)
310xxx-1-S	10.000 (254,0)	0.750 (19,0)	2.650 (67,3)	3.455 (87,8)	8.000 (203,2)	6.000 (152,4)	4.500 (114,3)	10.000 (254,0)	0.250 (6,3)	5.7 (2,6)	33.0 (15,0)
312xxx-1-S	12.000 (304,8)	0.750 (19,0)	2.650 (67,3)	3.455 (87,8)	10.000 (254,0)	8.000 (203,2)	4.500 (114,3)	10.000 (254,0)	0.250 (6,3)	7.2 (3,3)	36.0 (16,3)

- xxx = 045; 45 to 1 gear ratio
- xxx = 090; 90 to 1 gear ratio
- xxx = 180; 180 to 1 gear ratio

Dimensions

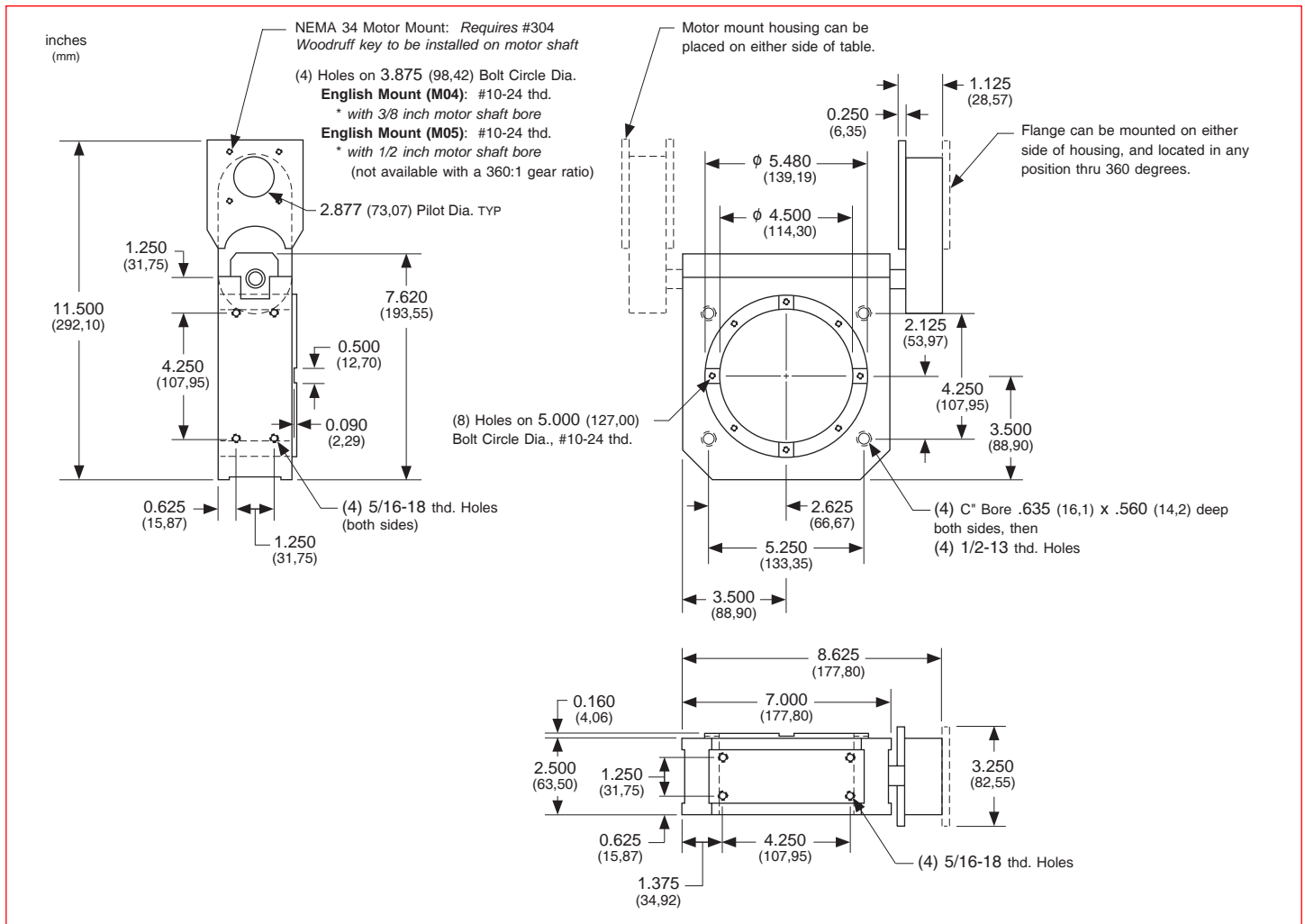


Dimensions & Specifications

Model Number	Table Top Diameter	Table Top Weight	Table Weight
	inches (mm)	lbs (kg)	lbs (kg)
406xxx-1	5.480 (139,2)	3.0 (1,4)	13.5 (6,2)

- xxx = 030; 30 to 1 gear ratio
- xxx = 090; 90 to 1 gear ratio
- xxx = 180; 180 to 1 gear ratio
- xxx = 270; 270 to 1 gear ratio
- xxx = 360; 360 to 1 gear ratio

Dimensions



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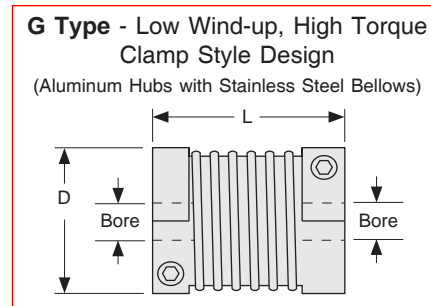
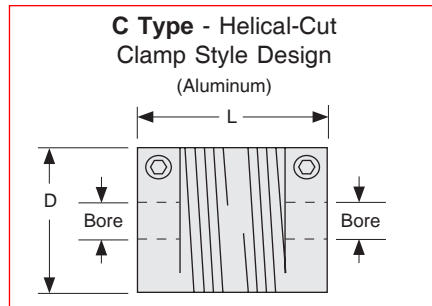
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Motor Couplings

LINTECH provides two different types of couplings that can be used to mount a motor to a 300 series positioning table. These couplings compensate for misalignment between the motor shaft & worm gear drive shaft extension. This provides for trouble-free operation as long as certain precautions are taken. The connected motor output torque should never exceed the coupling maximum torque capacity. Larger capacity couplings may be required for applications having high accelerations, large back driving loads, high torque output motors, or servo motors.



Model (1) Number	D inches (mm)	L inches (mm)	Bore Diameters				Weight ounces (grams)	Inertia oz-in ² (g-cm ²)	Wind-up arc-sec/oz-in (deg/N-m)	Max Torque oz-in (N-m)
			Table	Motor	Minimum (in) (mm)	Maximum (in) (mm)				
C075-187-aaa	0.75 (19,1)	1.00 (25,4)	187	aaa	.187 5	.250 8	0.8 (23)	.06 (10)	45.0 (1,8)	200 (1,4)
G075-187-aaa	0.79 (20,0)	1.02 (26,0)	187	aaa	.187 5	.375 10	0.8 (23)	.06 (10)	2.0 (0,08)	300 (2,1)
G075-250-aaa ⁽²⁾	0.79 (20,0)	1.02 (26,0)	250	aaa	.187 5	.375 10	0.8 (23)	.06 (10)	2.0 (0,08)	300 (2,1)
Possible values for aaa	187 = .187 inch 250 = .250 inch 375 = .375 inch		005 = 5 mm 006 = 6 mm 008 = 8 mm 010 = 10 mm							

Footnotes:

- (1) 0.85 inch (21,6 mm) is the largest diameter coupling allowed to be used with the 300 series because of the internal motor mount clearance.
- (2) This coupling option can not be used with any NEMA 23 motor mount. Also, it can not be used with the optional NEMA 34 motor mount for the 6 and 10 inch table top models. It can only be used with the optional NEMA 34 motor mount for the 8 and 12 inch table top models.

Coupling Part Numbers

C001 C075-187-250	C375 G075-187-250
C002 C075-187-005	C376 G075-187-375
C003 C075-187-006	C377 G075-187-005
C004 C075-187-008	C378 G075-187-006
	C379 G075-187-008
	C380 G075-187-010
	C381 G075-250-250
	C382 G075-250-375
	C383 G075-250-005
	C384 G075-250-006
	C385 G075-250-008
	C386 G075-250-010

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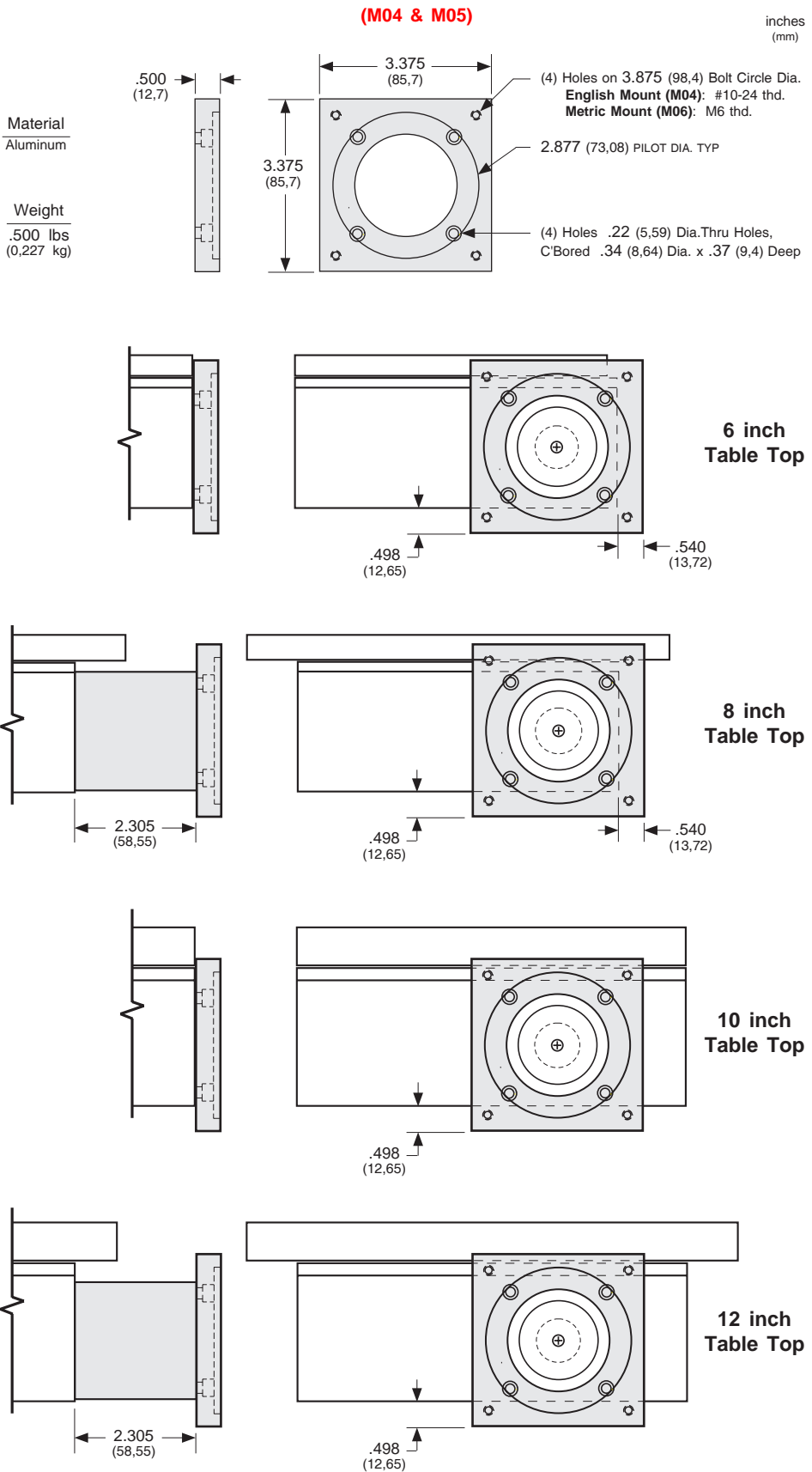
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Specifications Subject to Change Without Notice

NEMA 34 Motor Mount

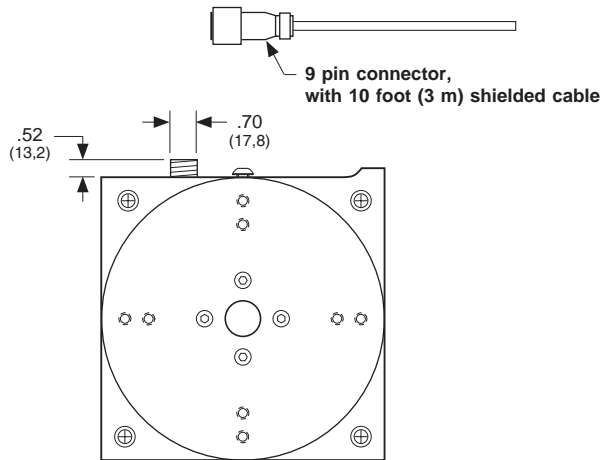
The 300 series NEMA 34 motor adapter bracket is an aluminum flange that mounts to the front of the NEMA 23 motor mount for the 6 & 10 inch table top diameters. For the 8 & 12 inch table top diameters, *LINTECH* provides a motor mount extension which allows for a NEMA 34 motor mount that will NOT contact the rotating table top. The bracket can be ordered in either an English, or Metric motor mount. *LINTECH* can provide adapter brackets for any step motor, or servo motor, that has other mounting requirements.



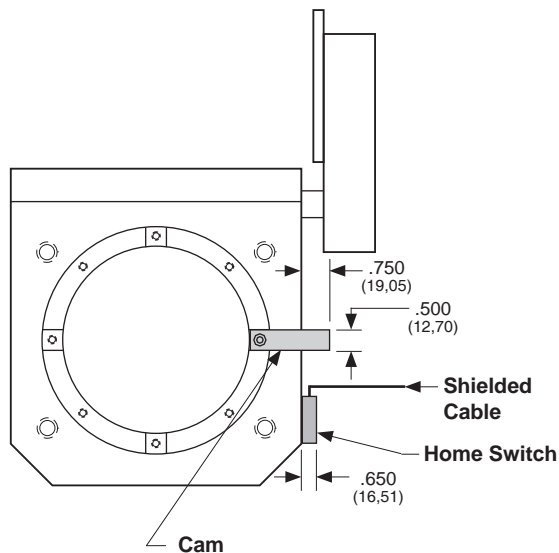
Home Switch

300 Series

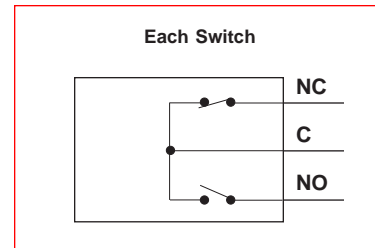
The home switch option on the 300 series is mounted internally to the positioning table and is wired to a connector which is located on the side of the base. A mating connector with a 10 foot (3 m) shielded cable is provided with either the reed, or hall, home switch option.

**400 Series**

The home switch option on the 400 series is mounted externally to the positioning table and is pre-wired with a 10 foot (3 m) shielded cable.

**Mechanical Switches**

Repeatability	: +/- 10 arc-sec
Electrical	: 5 amps @ 125 VAC 1 amp @ 85 VDC
Activation Style	: mechanical cam
Activation Area	: 0.5 inches (12.7 mm) of travel
Temperature Range	: - 25° C to + 85° C
Environment	: non wash down
Individual Switch Wiring	: none



Standard *LINTECH* Wiring : from table,
(provided when switch option is ordered with any table) 10 foot (3 m) shielded cable,
6 conductor, 24 AWG, unterminated leads

400 Series

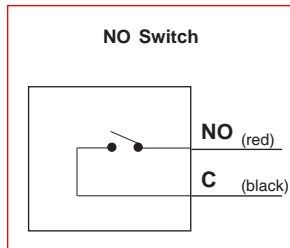
Wire Color	Description
Brown	HOME
Green	HOME Common
Silver	Shield



Home Switch

Non-Contact Reed Switches

- Repeatability : +/- 100 arc-sec
- Electrical : 1.0 amps @ 125 VAC
0.5 amps @ 100 VDC
- Activation Style : magnetic
- Activation Area : 0.30 inches (7,62 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : non wash down
- Individual Switch Wiring : 12 inch (305 mm) leads



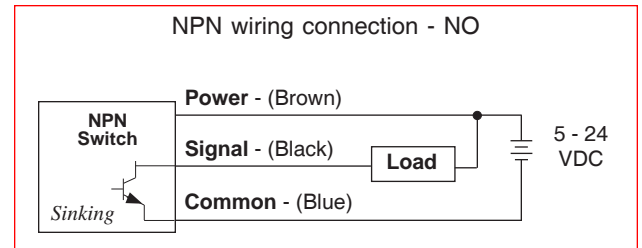
Standard *LINTECH* Wiring : from table,
(provided when switch option is ordered with any table) 10 foot (3 m) shielded cable, 6 conductor, 24 AWG, unterminated leads

300 Series

Pin #	Wire Color	Description
7	Brown	HOME (red)
8	Green	HOME Common (black) NO
3	Silver	Shield

Non-Contact Hall Effect Switches

- Repeatability : +/- 10 arc-sec
- Electrical : 5 - 24 VDC
15 mA - power input
25 mA max - signal
- Actuation Style : magnetic
- Activation Area : 0.32 inches (8,13 mm) of travel
- Temperature Range : - 10° C to + 60° C
- Environment : wash down
- Individual Switch Wiring : 12 inch (305 mm) leads



Standard *LINTECH* Wiring : from table,
(provided when switch option is ordered with any table) 10 foot (3 m) shielded cable; 9 conductor, 24 AWG, unterminated leads

300 Series

Pin #	Wire Color	Description
5	Orange	Home Power (brown)
7	Yellow	Home (black) switch NO
8	Grey	Home Common (blue)
3	Silver	Shield

NO - Normally Open

Unit Conversions

Torque Conversions

Present Units	Convert To	Multiply By
Gram-centimeters	newton-meters -----	0.0000981
Gram-centimeters	ounce-inches -----	0.0138874
Gram-centimeters	pound-inches -----	0.000868
Gram-centimeters	pound-feet -----	0.0000723
Newton-meters	gram-centimeters ----	10,197.162
Newton-meters	ounce-inches -----	141.612
Newton-meters	pound-inches -----	8.85
Newton-meters	pound-feet -----	0.73756
Ounce-inches	gram-centimeters ----	72.0077
Ounce-inches	newton-meters -----	0.007062
Ounce-inches	pound-inches -----	0.0625
Ounce-inches	pound-feet -----	0.005208
Pound-inches	gram-centimeters ----	1,152.0
Pound-inches	newton-meters -----	0.11299
Pound-inches	ounce-inches -----	16.0
Pound-inches	pound-feet -----	0.08333
Pound-feet	gram-centimeters ----	13,825.5
Pound-feet	newton-meters -----	1.3558
Pound-feet	ounce-inches -----	192.0
Pound-feet	pound-inches -----	12.0

Distance Conversions

Present Units	Convert To	Multiply By
Arc-minutes	degrees -----	0.016666
Arc-seconds	degrees -----	0.000277
Centimeters	inches -----	0.3937
Centimeters	feet -----	0.03280
Centimeters	microns -----	10,000.0
Degrees	arc-minutes ----	60.0
Degrees	arc-seconds ----	3,600.0
Degrees	radians -----	0.017453
Feet	centimeters -----	30.48
Feet	meters -----	0.3048
Inches	centimeters ----	2.54
Inches	Km -----	0.0000254
Inches	meters -----	0.0254
Inches	microns -----	25,400.0
Inches	millimeters ----	25.4
Km	inches -----	39,370.0
Meters	feet -----	3.2808
Meters	inches -----	39.37
Meters	microns -----	1,000,000.0
Microns	centimeters ----	0.0001
Microns	inches -----	0.00003937
Microns	meters -----	0.000001
Microns	millimeters ----	0.001
Millimeters	inches -----	0.03937
Millimeters	microns -----	1,000.0
Millimeters	degrees -----	57.295779

Inertia Conversions

Present Units	Convert To	Multiply By
Gram-cm ²	ounce-inches ² ----	0.00546745
Gram-cm ²	ounce-inch-sec ² --	0.000014161
Gram-cm ²	pound-inches ² ----	0.000341716
Gram-cm ²	pound-inch-sec ² --	0.000000885
Gram-cm ²	pound-feet-sec ² --	0.000000074
Ounce-inches ²	gram-cm ² -----	182.901
Ounce-inches ²	ounce-inch-sec ² --	0.00259008
Ounce-inches ²	pound-inches ² ----	0.0625
Ounce-inches ²	pound-inch-sec ² --	0.00016188
Ounce-inches ²	pound-feet-sec ² --	0.00001349
Ounce-inch-sec ²	gram-cm ² -----	70,615.4
Ounce-inch-sec ²	ounce-inches ² ----	386.0
Ounce-inch-sec ²	pound-inches ² ----	24.13045
Ounce-inch-sec ²	pound-inch-sec ² --	0.0625
Ounce-inch-sec ²	pound-feet-sec ² --	0.00520833
Pound-inches ²	gram-cm ² -----	2,926.41
Pound-inches ²	ounce-inches ² ----	16.0
Pound-inches ²	ounce-inch-sec ² --	0.0414413
Pound-inches ²	pound-inch-sec ² --	0.00259008
Pound-inches ²	pound-feet-sec ² --	0.00021584
Pound-inch-sec ²	gram-cm ² -----	1,129,850.0
Pound-inch-sec ²	ounce-inches ² ----	6,177.4
Pound-inch-sec ²	ounce-inch-sec ² --	16.0
Pound-inch-sec ²	pound-inches ² ----	386.0
Pound-inch-sec ²	pound-feet-sec ² --	0.0833333
Pound-feet-sec ²	gram-cm ² -----	13,558,200.0
Pound-feet-sec ²	ounce-inches ² ---	74,128.9
Pound-feet-sec ²	ounce-inch-sec ² --	192.0
Pound-feet-sec ²	pound-inches ² ---	4,633.06
Pound-feet-sec ²	pound-inch-sec ² -	12.0

Load Conversions

Present Units	Convert To	Multiply By
Grams	newtons -----	0.009806
Grams	ounces -----	0.03528
Grams	pounds -----	0.002204
Kilograms	pounds -----	2.2046
Newtons	grams -----	101.971
Newtons	ounces -----	3.59692
Newtons	pounds -----	0.224808
Ounces	grams -----	28.3495
Ounces	newtons -----	0.27802
Ounces	pounds -----	0.0625
Pounds	grams -----	453.592
Pounds	kilograms -----	0.45359
Pounds	newtons -----	4.44824
Pounds	ounces -----	16.0
Pounds	tons -----	0.0005
Tons	pounds -----	2,000.0